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ABSTRACT

The mental and physical development of 994 elementary school children, recruited from populations of High, Medium and Low socio-economic and educational level in Israel was followed up for two (and in part for three) years. The pupils were given mental tests to measure the ability to understand the structure and direction of second order relationships and to reason a priori, even if the correct logical deduction is dissonant with experience. Physical growth was also assessed. Elaboration of parametric correlations indicated that substantial relations between physical and mental growth show up when season of birth is controlled by dichotomizing the sample into Winter and Summer born subjects. Applying a nonparametric data analysis, based on pairs matched closely for chronological age and parental education, and using longitudinally assessed criteria of physiological maturation as independent variables, significant relationship between physiological maturation and mental growth were detected at all three socio-economic and educational levels. The findings indicate that pre-adolescence and early puberty are critical periods of maturationally determined acceleration in mental development, during which conspicuous progress is made in the ability of formal reasoning. (Author/SK)

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FINAL REPORT

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PHYSIOLOGICAL MATURATION
AND THE DEVELOPMENT OF FORMAL THOUGHT AT ADOLESCENCE

Reuven Kohen-Raz

The Hebrew University, Jerusalem, Israel

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ABSTRACT

The mental and physical development of 994 elementary school children, 5th, 6th, 7th, and 8th graders of both sexes, recruited from populations of High, Medium and Low socio-economic and educational level in Israel was followed up for two (and in part for three) years. The pupils were given mental tests, administered four times during the follow-up period and supposed to measure Formal Reasoning, defined operationally as the ability to understand the structure and direction of second order relationships and to reason a priori, even if the correct logical deduction is dissonant with experience. On the other hand, physical and dental growth, development of pubic hair and age at menarche were assessed in 6 longitudinal examinations. Elaboration of parametric correlations indicated that substantial relations between physical and mental growth show up when season of birth is controlled by dichotomizing the sample into Winter (January to June) and Summer (July to December) born subjects, the latter tending to be precocious in mental and physical growth, in spite of their younger chronological age. Applying a non-parametric data analysis based on pairs matched closely (by days) for chronological age and parental education, and using longitudinally assessed criteria of physiological maturation as independent variables, significant relationship between physiological maturation and mental growth were detected at all three socio-economic and educational levels.

The findings indicate that pre-adolescence and early puberty are critical periods of a maturationally determined acceleration in mental development, during which conspicuous progress is made in the ability of formal reasoning.

INTRODUCTION

Formal reasoning (or formal operational thought) is defined by Lunzer (16) as the mental capacity to form and understand second order relationships in the sense of performing reversible operations with complex cognitive units, which themselves are relations, classifications, seriations, etc. Concrete reasoning (or concrete operational thought) on the other hand are those reversible operations which enable the manipulation of mental units of a more elementary and stimulus-bound character, i.e. chiefly perceptions and their symbolic representatives. One of the characteristics of formal operational thought is its power to transcend the limits of empirical facts and findings and to conceptualize knowledge within a superordinated system of hypothetical and deductive reasoning, which makes possible the prediction of facts and situations not yet experienced and possibly never to be experienced.

Inhelder and Piaget (11) tested the development of formal operational thought by letting adolescents and preadolescents perform simple experiments in elementary physics. In order to evaluate their performance, they used as main criteria the Subject's ability to formulate a number of hypotheses and to prove them by systematic experimentation, based on deductive reasoning and on the (not conscious) use of the 16 basic combinations of the logical calculus. Lunzer (16) used specially structured verbal and numerical analogies as tests of formal reasoning. Donaldson (5) examined the development of higher levels of operational thought by means of "Matching Problems," "Problems of Formal Deduction," "Series Extrapolation," etc. Her criterion of evaluation was the incidence of certain types of errors, defined as "Structural," "Arbitrary" and "Executive."

Inhelder and Piaget (11) maintain that the final stages of formal operational thought are attained at adolescence and late adolescence (14-16 years). However, there is ample evidence from the inspection of their data, as well as of those of Donaldson (5) and Lunzer (16), that Subjects at an earlier chronological age are able to reason at the formal level, i.e. predict the outcome of simple experimentation (11), abstain from "Structural Errors," and discover the correct relationships in complex verbal and non-verbal analogies in spite of powerful distractors (5).

These observations, as well as the survey of the relevant literature, gave rise to the hypothesis that the decisive transitory stage from concrete to formal operative thought might be located at the earlier phases of adolescence. Furthermore, it was suspected that the development of higher mental processes is possibly related to organismic age (18) as an important independent variable, besides mental age, mental potential, educational factors, etc.

This latter assumption is based on recent theories on the relationship between brain maturation and the incidence of puberty, as formulated by Tanner (25): This author views the pubertal hormonal changes as a chain reaction, initiated by the raising of the hypothalamic threshold of sensitivity to the antagonistic effect of infantile estrogen level on the pituitary excretion of gonadotropins. According to Tanner, this raising of the hypothalamic threshold is effected by hitherto unknown processes probably linked to the general maturation of the brain. General functional maturation of the cerebrum at preadolescence and early adolescence has been demonstrated in developmental EEG studies such as those by Henry (10) and more recently by Corbin and Bickford (4).

Ljung (15) in a recent study has been able to demonstrate the existence of an adolescent spurt in mental growth, assumed to be evidence of a positive acceleration of some kind in the maturation of the biological correlates of mental achievement during the period before the apex of this spurt, and a negative acceleration after this apex (op. cit., p. 257). His results suggest a faster growth rate in girls, as well as the occurrence of a phase difference in mental maturation between the sexes. Besides these general findings, Ljung has not detected any direct relationship between organismic and mental growth during adolescence, chiefly because his central independent variable is chronological age. His design is strictly cross-sectional and his instruments of mental measurement are tests of general intelligence and achievement. Although he is able to define two central factors, measured by his tests, namely a verbal and a mathematical factor, he does not concentrate on specific functions, such as the function of "Formal Reasoning," which is the main dependent variable in the present study. However, among his suggestions for further research, Ljung explicitly recommends the use of "developmental" (i.e. "organismic") age as the independent variable and proposes a longitudinal design.

Tanner (25, p. 210), cited by Ljung (15, p. 12), states that "the data on the growth of special abilities is scantier (than that on the growth of general abilities), but suggest rather more strongly that in some particular areas a spurt may occur at adolescence and that differentiation of sexes may also take place. Whether this (even if it occurs) reflects growth and maturation of the neural basis of mind, or whether simply differential education and specialization of interests according to sex and age is quite unknown."

OBJECTIVES OF STUDY

The purpose of this investigation was to demonstrate a possible relationship between cognitive and organismic growth during a critical phase of development, namely preadolescence and adolescence.

From a theoretical point of view it was intended to show that interactions between physiological and mental functions may be traced, when due attention is paid to more minute substages or phases of development and their respective sequential order. These patterns of interaction may be complex and not necessarily manifest in an overall linear relationship, which has been generally expected but could not be demonstrated in substantial size by the previous studies [Abernethy (2), Jones (13), Ljung (15)].

From a more practical point of view, it was hoped that the study might contribute to the solution of some practical issues, namely:

1. Selection procedures for studies at the post-elementary level consider the capacity of formal reasoning as a main criterion of differentiation between adolescent or preadolescent candidates for various streams and types of secondary education, using chronological and mental age as the basic developmental frame of reference. Introducing organismic age as an additional variable, these selection procedures can be rendered more valid and the possibilities of penalizing "late developers" will be reduced.

2. Considerable efforts are invested in fostering and stimulating the mental development of the "culturally deprived," in the hope of raising their mental capacity and learning potential. Although it is generally agreed that such re-educational measures should be applied at the earliest ages possible, little attention is paid to "optimal" and "critical" phases of mental development, during which massed and intensive training would be most opportune and beneficial.

HYPOTHESIS

In order to formulate the hypothesis of the study in operational terms, four typical phases of pubertal growth must be defined, as detailed below:

Phase I: Preadolescence. Increment of bodily growth and weight is minimal. Although the secretion of adrenal androgens and estrogens increases conspicuously, no changes in secondary sex characteristics are as yet discernible.

Phase II: Early Adolescence. At this stage the typical "adolescent growth spurt" occurs, as manifested by increase in standing height, body weight, and by the growth and development of sex organs and secondary sex characteristics. These changes are assumed to be due to the increased release of gonadotropins, as well as of adreno-corticotropic, thyreo-tropic and growth hormones from the anterior pituitary.

Phase III: Puberty Proper. Under the influence of the gonadotropins, the growth of the internal sexual organs is stimulated and they begin to produce reproductory cells (semen and ovule) on the one hand, and estrogens, progesterone (in the female), as well as androgens, estrogens and testosterone (in the male) on the other. These latter hormones have an antagonistic effect on the gonadotropin-releasing mechanism of the pituitary and are therefore assumed to be--in part at least--responsible for the cessation of the adolescent growth spurt.

Phase IV: Postadolescence. Bodily structure and physiological functions approach the adult scope and quality. Hormonal processes become equilibrated and adult fertility is attained. Muscular strength increases in the male. Physical growth gradually slows down.

Using these four phases as a basic frame of reference of organismic age at adolescence, the following three hypotheses can now be formulated:

Hypothesis I: If a relationship exists between organismic age and the attainment of higher levels of operational thought, Subjects more advanced in their adolescent organismic development, as defined above, will show higher achievements on tests of "Formal Reasoning," when chronological age is held constant.

Hypothesis II: If the attainment of formal reasoning is related to "critical stages" of pubertal growth, a more pronounced relationship between mental level of organismic development will appear at one or two of the four phases of pubertal physiological maturation.

Hypothesis III: If brain maturation is one of the preconditions of the "adolescent growth spurt" and at the same time also a central factor in higher mental functioning, the "critical stage" of transition from concrete to formal reasoning should be located close to Phase II of adolescent growth.

METHOD

Measurement of the independent variables

According to the hypothesis, the main independent variables are "organismic age," as well as "stages of pubertal maturation," as outlined above. The assessment of organismic age per se is a straightforward procedure, based on the measurement of body dimensions (such as height, weight, pelvic width), observation of typical physiological changes (advent of menarche, appearance of pubic hair), assay of endocrinological secretion, roentgenography of skeletal growth, etc.

On the other hand, substages of pubertal and especially prepubertal growth (the latter being not yet accompanied by secondary sex characteristics) can often not be measured by cross-sectional examinations and consequently require longitudinal observations of individual developmental patterns. More specifically, the "adolescent growth spurt," which is assumed to be a critical period of mental maturation cannot be located but by comparisons of successive height increments.

Obviously, the measurement of the independent variables in this study requires a longitudinal, or mixed longitudinal-cross-sectional design.

Measures and measurement of the dependent variables

In order to measure the dependent variables, namely formal reasoning, appropriate instruments, supposedly measuring this function, had to be selected. Here some difficulties were encountered. As standardized tests of formal reasoning are not as yet available, the most obvious way to solve this problem seemed to be to replicate Inhelder's and Piaget's experiments described in their by now classical treatise of this subject (11) and to construct a reliable and scalable test of formal reasoning, similar to an instrument which has been recently elaborated in the domain of concrete operational thought by Tuddenham (26). However, it soon became evident that Inhelder's and Piaget's scientific mini-experiments were of doubtful reliability, when applied as a standard procedure, besides the fact that they require individual administration. The latter procedure is not only time-consuming but also impracticable, when a whole class of pupils has to be tested. Either several testers have to carry out the examinations simultaneously or else the pupils will readily communicate their experiences to each other.

Consequently it was decided to use exclusively group tests and eventually to construct them. According to Guttman's "facet analysis" of intelligence (7) it seemed to be indicated to select instruments which would cover the three modi of intellectual interaction and information processing: numerical, verbal and perceptual. That is, the battery was supposed to include numerical verbal and perceptual tests of formal reasoning. From the point of view of test structure, Lunzer's (16) and Donaldson's (5) studies have demonstrated that complex analogies may be conveniently used as tests of formal reasoning, as they demand the manipulation of relationships, especially when certain distractors, differing from the correct solution only in directionality, are built into the items. (See Lunzer (16) and Appendix to this report, page 95). On the other hand, syllogisms and questions of deductive reasoning are classical tests of formal thought, and they can be rendered more rigorous, as well as more appealing to children, when the content of the statements is dissonant with experience (See Donaldson (5) and Appendix, page 95). Besides, the ability to overcome this dissonance is an additional testological indicator of the power to reason a priori, i.e. to be able to prove the truth of a statement without taking resort to empirical evidence.

These considerations lead to the selection or construction, respectively, of the following tests:

Numerical and Verbal Analogies, which were constructed according to principles employed by Lunzer (16) and Donaldson (5). (For detailed description see Appendix). Raven Matrices seemed to be a convenient format of complex perceptual analogies. In addition, permission was granted to use the unpublished forms of an Analytical Test recently elaborated by Guttman and Schlesinger (8) which is based on the principle of Raven's Matrices, but surpasses the latter by a specially designed distractor system, and a carefully controlled sequence of item difficulty.

Two Questionnaires of Deductive Reasoning were constructed. They are similar to instruments used by Donaldson (5), but they were adapted to the Hebrew language and provided with "directional distractors" (See Appendix). As none of the previously described tests has locally standardized norms, it seemed to be appropriate to add the MILTA (19), a Verbal Intelligence Test recently standardized on a representative Israeli population.

This test has four parts: Vocabulary, Sentence Completion, Analogies and Concept Formation. The Analogy items of this battery differ from the previously described Verbal Analogies, in that the former have not been specially designed to measure formal reasoning.

As the design of the study is longitudinal, repeated mental testing had to be taken into consideration, which in turn requires the control of retest effects. This was attained in part by using parallel forms.* The MILTA has two parallel versions for two levels respectively, so that four different forms could be used. For the Numerical, and Verbal Analogies, as well as for the Questionnaires of Deductive Reasoning, three parallel tests were constructed respectively, using Guttman's method of systematic distractor construction. In the case of the Perceptual Analogies, represented by the Raven and Analytical Test, the same forms were administered repeatedly, assuming that the high variety and complexity of the items would considerably reduce retest effects.

Verbal Analogies and Questions of Deductive Reasoning were scored not only for correct responses, but also for "Directional Errors," consisting in the choice of the "Directional Distractor," which differs from the correct solution only in the direction of the logical relationship (See Appendix). Evidently, Directional Errors are "half solutions" and possibly measure an intermediate stage of "attempted, but incomplete" formal reasoning. In addition, an Error Score, indicating failure to grasp the logical relationship, was computed. This score is actually the total number of attempted items minus correct responses and Directional Errors. It was computed for all tests of the battery except the MILTA and Guttman's Analytical Test. The performances on all mental tests given in this study were timed.

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*The correlations between these parallel forms, administered in close temporal distance are between .60 to .80 within the same age/grade level and wit in the restricted range of a student's population of higher intelligence level.

The intervening variables

The most important intervening variable, which has to be controlled in this study--besides sex and ethnic origin--is parental education, which is obviously related to the constitutional as well as to the environmental factors shaping the child's "intellectual potential." On the other hand, it proved to be difficult to isolate socio-economic level as a separate independent variable in Israeli populations, first because of its intimate relationship with parental education, second because of the lack of objective criteria to classify socio-economic status on a scale scientifically validated on the local population, which is characterized by a high social mobility and flexibility of status values.

Ethnic origin, in turn, also showed up to be linked with parental education, in that only very few parents of Oriental origin could be sampled which would have college degrees while practically no Western families with incomplete elementary school education will be found in Israel.

As scholastic experience had also to be taken into consideration as intervening variable, it seemed appropriate to sample three types of schools, each type located in an environment which could be characterized as to parental educational and professional level, as well as to socio-economic status and ethnic origin; the latter two being substantially correlated with the former, as stated before. (See Tables 2, 3, 4 on pages 14-16).

An additional intervening variable was unexpectedly discovered in the course of our Pilot explorations, namely the Season of Birth. Actually, this subject seems to be worthwhile to be investigated by its own merits and some of our tentative findings in this respect will be reported below. (Pages 35 - 38).

The effect of birth season or what will be referred to in abbreviated form "the seasonal effect," is manifest in the fact that the younger half of students within the range of one grade level who are born between July and December tend to be physically and mentally equal or even precocious to the elder half born between January and June of the same year* while between adjacent grades there is a linear progress in mental and physical development.

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*In Israel the officially ruled age range of each school grade is the birthday between January 1 and December 31 six years before the year of entering the first grade on September first.

As shown on Figure 1, it is the second half of the year which in Israel has the highest temperatures, continuing well until the end of October. Therefore subjects born in this part of the year will be referred to as "Summer subjects" as against "Winter subjects" born in the first semi-annual period.

Actually, the effect of birth season on mental and physical development has been observed and reported by several investigators.* The subject however seems to have received little attention in current psychological and educational research.

From a pure methodological point of view, it turned out to be necessary to control this variable rigorously. This was done in two ways: The sample was dichotomized according to birth season, namely into "Winter Subjects," born between January 1 and June 30 and into "Summer Subjects," born between July 1 and December 31. This partition as well as the designation of the two parts of the population, is purely arbitrary, but it seemed to provide an optimal control of the birth season factor for the purposes of this study.

The second way of control consisted in matching pairs by chronological age, the age distance between partners being not less than 60 days. This in turn led to the application of non-parametric "matched pairs" techniques, as will be described later.

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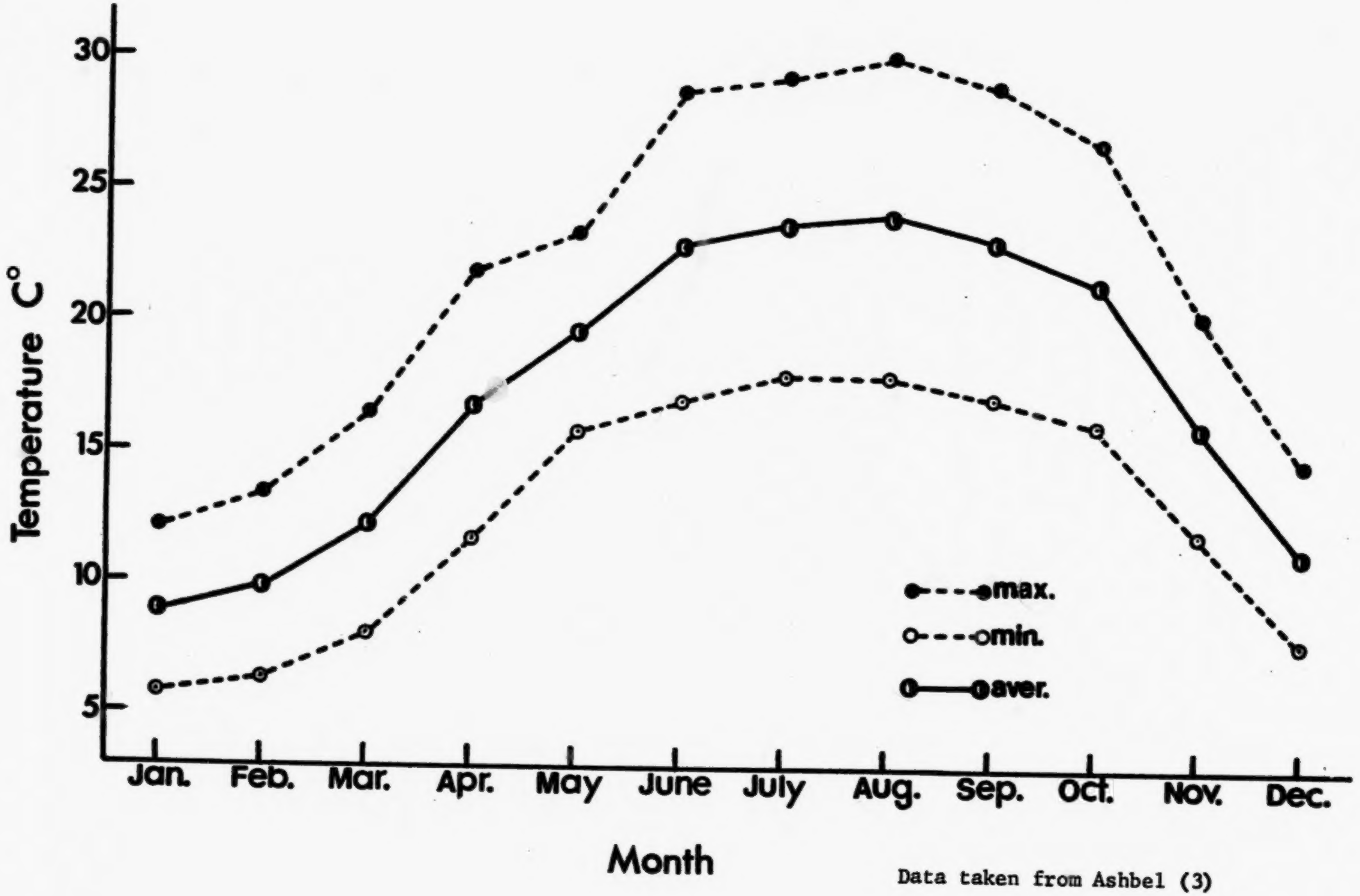
*Pintner and Ferlano (20) summarize a considerable number of studies published up to 1942 dealing with this phenomenon. Besides this, Sainsburg (21) reports a higher incidence of dental caries in deciduous teeth in Winter born British children at school entrance age. Very recently several investigations dealing with the effect of birth season on the 11+ examination and on High School Streaming in England and Scotland have been reviewed by Sutton (24). Pupils born between September and December (Summer subjects according to our definition) are definitively precocious in their mental achievements. The possibility that this is an effect of the British Nursery School system, providing children born in autumn with a longer period of nursery schooling does not seem to be a satisfactory explanation. The most plausible explanation of the phenomenon seems to be that of Fitt (6), namely that Summer born subjects pass the first two months of their embryological development, which is critical for the growth of the nervous system, in the Winter period. The human organism, although not sleeping in winter as many animals, still shows at this season a quieter metabolism and greater restfulness, which is supposedly favorable to embryological growth.



Data taken from Ashbel (3)

Figure 1

Annual Temperatures of Jerusalem

The mixed cross-sectional/longitudinal design

In order to obtain maximal and as far as possible, longitudinal information on pubertal growth in a minimum of time (2 years), a mixed cross-sectional/longitudinal design was applied. In each of the three environments, stratified according to parental educational, socio-economic (and implicitly ethnic) background, the four last elementary grades were sampled, namely grades 5, 6, 7 and 8 and followed up during two scholastic years. Only in the low and high level environment, the eighth graders could be partly re-examined while continuing their studies at the ninth grade. The majority of eighth graders, however, would either have left school (compulsory education in Israel at the time of this study terminated at the age of 14, i.e. the eighth grade) or left for High and Vocational Schools at different locations, where it was technically impossible to conduct systematic follow-up examinations. A Pilot Sample of girls from two environments (high and medium level) composed of 6, 7 and 8 graders, was partly followed up for three scholastic years.

Mental examinations were scheduled in November and June (i.e. two months after beginning and at the very end of the academic year), thus yielding four sets of mental test data, spaced more or less evenly by 6 months. Physical examinations of height and weight (including sitting and standing height, shoulder and pelvic width) were carried out three times during the scholastic year: in November, February/March and June. Although 6 (respectively 9) sets of measurements were obtained during the two (or three) years period of the study, they could not be spread at as even intervals as the mental examinations. Dental examinations were given simultaneously with the other physical growth measurements (i.e., three times per year), examinations of pubic hair however, were limited to one per year.

For the sixth, seventh and eighth grades of the Main Study data for two independent samples could be gathered, i.e., from one sample, tested initially at that grade, and from another being followed up after having advanced to this level. In addition, four sets of overlapping, longitudinal mental and physical measurements could be secured, each covering a 2-year period but all of them together spreading over a period of 5 years in the high and low level sample, and over a period of 4 years in the medium level groups. Data of such structure and stratification were thus supposed to reflect the periods of prepubertal and early pubertal mental and physical growth in a fairly representative sample of Israel's preadolescents and adolescents.

SAMPLE

The sample of the Pilot Study was recruited from three elementary schools in Jerusalem, two of them considered to be of high socio-economic level and parental educational background and one of them of medium level. All subjects were girls. Details are presented on Tables 1 and 2. The Main Study was based on a larger, more representative sample of both sexes. The High Level group was represented by one on Jerusalem's prominant Junior High Schools, many parents being high ranking officials, University professors and professionals. The Medium Level group was recruited from two schools, also in Jerusalem. One is located in downtown and has a student population of heterogeneous background, socio-economically, educationally and ethnically. The second is a religious school, parents being mostly white collar, non-professional workers. Finally two schools from an immigrant town near Jerusalem were included, most parents being vocationally unskilled or semiskilled, who immigrated during the last 10 to 15 years, mostly from the North African and Arab countries. The children are considered by the Ministry of Education as "Culturally Disadvantaged." One school of this group is religious-orthodox. For further details see Tables 1, 3 and 4.

In the final data elaboration we excluded all those subjects who were not born between January 1 and December 31 six years before the year during which they entered the first elementary grade in September. These subjects must be assumed to be either gifted or retarded, as they were either precociously admitted to school, jumped grades or on the other hand, were retained in Kindergarten or repeated classes. The information on the longitudinal attrition and on the actual number of subjects participating in each examination during the follow-up can be obtained by inspection of Tables 109-142 (Appendix, pages 167-200).

TABLE 1

SAMPLE

PILOT STUDY

GIRLS

Grade	High Level	Medium Level	Total
6	39	19	58
7	43	24	67
8	42	11	53
TOTAL	124	54	178

MAIN STUDY

BOYS

Grade	High Level	Medium Level	Low Level	Total
5	40	64	21	125
6	44	40	27	111
7	32	36	16	84
8	37	37	12	86
TOTAL	153	177	76	406

GIRLS

Grade	High Level	Medium Level	Low Level	Total
5	26	52	27	105
6	41	52	14	107
7	33	43	29	105
8	31	40	22	93
TOTAL	131	187	92	410

TABLE 2

PILOT SAMPLE

PARENTAL COUNTRY OF ORIGIN

(in percentages)

		COUNTRY OF ORIGIN			
	Level	Israeli born	Oriental countries	Europe	Other
Father	High	37	28	32	3
	Medium	14	39	44	3
Mother	High	39	24	34	3
	Medium	31	28	36	5

PARENTAL OCCUPATION

		OCCUPATION			
	Level	Skilled Worker	Non-Academic White Collar	Academic Professional	Housewife
Father	High	49	39	12	
	Medium	52	37	11	
Mother	High	8	40	3	49
	Medium	9	17	3	71

TABLE 3

MAIN SAMPLE

PARENTAL COUNTRY OF ORIGIN
FATHER

(in percentages)

	COUNTRY OF ORIGIN*						
Environment	1	2	3	4	5	6	7
High	39.7	18.9	31.0	3.0	5.6	1.5	0.0
Medium I	26.7	22.8	29.1	0.0	12.5	8.6	0.0
Medium II	36.8	10.4	17.9	4.5	19.5	10.1	0.6
Low I	0.0	0.0	0.0	0.0	18.1	80.6	1.1
Low II	0.0	1.1	15.1	0.0	24.4	58.1	0.0

MOTHER

	COUNTRY OF ORIGIN						
Environment	1	2	3	4	5	6	7
High	44.8	17.4	26.6	2.2	7.1	1.4	0.0
Medium I	31.7	18.2	23.0	0.7	15.0	10.3	0.7
Medium II	39.2	10.7	14.1	5.1	17.9	11.2	0.9
Low I	0.0	1.1	0.0	0.0	17.7	79.9	1.1
Low II	11.8	1.0	10.7	0.0	23.6	52.6	0.0

*Legend:

1. Israel
2. Western Europe and America
3. Eastern Europe
4. Balcan
5. Turkey, Persia, Syria, Egypt, Lebanon, Iraq
6. Algeria, Tunis, Morocco
7. Other

TABLE 4

MAIN SAMPLE

PARENTAL EDUCATION

(in percentages)

		LEVEL OF EDUCATION*					
	**Environment	1	2	3	4	5	6
Father	High	7.6	0.6	1.7	30.7	2.1	56.7
	Medium	34.9	3.7	3.1	37.3	3.4	17.3
Mother	High	8.8	0.7	0.7	43.1	14.4	31.9
	Medium	40.3	8.6	2.0	30.3	9.3	9.3

*Legend:

1. Elementary School
2. Elementary School + 2 years
3. Vocational School
4. High School
5. Teacher College, Non-Academic Professional Diploma or certificate
6. University or college degree (B.A. and above)

**Most parents in low level population have no clearly defined educational level. It is essentially completed elementary education or less.

PROCEDURE

The mental and physical examinations of the Pilot Sample started in October 1966 and continued until June 1969. The details of the testing schedule are given on Table 5.

The sample of the Main Study was given four mental and six physical examinations, as specified on Table 5 . In order to avoid contamination, all mental tests, except the MILTA, were given to each half of one grade population in two simultaneous sessions. The MILTA Tests were given to the whole population of one grade (35 to 40 Subjects) but pupils were seated in such a way that the two parallel forms of these tests were given to two adjacent rows of desks. This reduced the time pupils were exempted from class while minimizing contamination of performances. Obviously at retest, the parallel forms were shifted between the desk rows.

At the end of the two scholastic years (Examinations II and IV) only limited time was put at our disposal to test the eighth and ninth graders of the High Level High School, chiefly because of the heavy load of final examinations given at that time by school authorities.

The physical growth measures were taken by qualified school nurses, specially hired for this project. To assess shoulder and pelvic width, Precision Anthropometers ordered from Great Britain were employed.

According to the decision of the School Medical Authorities, only the School Physician in charge of his school was permitted to carry out the examinations of pubic hair growth. As a male physician was responsible for the High Level High School, the girls could not be examined, as it was considered to be not appropriate. As similar difficulties were encountered in two other schools belonging to the orthodox-religious stream, it was finally decided to limit pubic hair assessments to the male sample, as the longitudinal growth pattern and incidence of menarche turned out to be reliable yardsticks of the female pubertal growth process.

In addition, the School Dentists, paid for overtime from our budget, followed up the dental growth of the pupils.

Reliability of physical measurements was established by having two nurses performing the physical measurements on an auxiliary sample, and by examining pubic hair growth in a group of boys by both the physician and the responsible school nurse.

In spite of repeated attempts, permission to examine skeletal growth by X-rays was not granted. In the light of the technical difficulties involved (pupils have to be bussed to X-ray stations) the narrow range of wrist bone growth in these age groups and the good results obtained with simple anthropometric methods, the effort to secure these data seems hardly justified in retrospect.

TABLE 5

SCHEDULE OF LONGITUDINAL TESTING

MAIN SAMPLE

	November 1967	June 1968	November 1968	June 1969
Num. Anal.	A*	B	C	A
Verbal Anal. I	A	-	B	A
Verbal Anal. II	A	B	C	A
QDR I	A	-	B	A
QDR II	A	B	C	A
MILTA	Grades** 5 & 6 Grades 7 & 8 A	Level I Level II B	Grades 6 & 7 Grades 8 & 9 A	Level II Level III B
RAVEN	X		X	
GSAT	X		X	

*Letters indicate use of parallel forms.
**Numbers of grades refer to actual grade level at time of testing.

DATES OF TESTING

PILOT SAMPLE

Mental Tests:	October 1966, June 1967, October 1967, June 1968, October 1968, June 1969.
Physical Examinations:	December 1966, March 1967, June 1967, November 1967, March 1968, June 1968, November 1968, March 1969, June 1969.

MAIN SAMPLE

Mental Tests:	November 1967, June 1968, November 1968, June 1969
Physical Examinations:	November 1967, March 1968, June 1968, November 1968, March 1969, June 1969

The method of data elaboration

Two different methods of data elaboration were employed: traditional, parametric correlation techniques, assessing the relationship between the measures of physical growth (namely height, weight, shoulder and pelvic width and dental age) and between achievement scores on the various mental tests, described before. Advantage was taken of the available longitudinal data, in that separate correlations were repeatedly computed for the mental tests on each of the four successive examination dates. For each examination date, the mental scores were then correlated "prospectively" and "retrospectively" with the 6 longitudinal physical growth measures. That is, as example, the mental test given in November 1967 was correlated with the six physical growths measures taken between that date and June 1969.

A mental test given in June 1969 would be correlated with all the six preceeding physical growth data, one given in June 1968 with the three preceding and the three succeeding ones, etc.

By this method it was hoped to explore the stability and reliability of an eventual relationship between physical and mental growth over time and to examine, whether the optimal relation between physical and mental development at pre-adolescence and puberty may possibly be found between temporally distant measurements.

Because of the necessity to control the seasonal factor, the sample was split into 48 subgroups (4 ages x 2 sexes x 2 seasons x 3 environments) which obviously caused a considerable shrinkage of N within the subpopulations. It was therefore preferred to compute the correlations for the maximum subjects available at each temporal constellation of measurements and not to restrict the analysis to the longitudinally constant N, which, because of its smallness would have produced findings of low reliability. On the other hand, the fluctuations in the "prospective" and "retrospective" correlations may thus be primarily due to change in subsample size and not potentially reflect "delayed" effects of physical maturation on mental growth. However, if in spite of the changing N the pro- and retrospective correlation coefficients remain relatively constant, their stability must be considered as a sign of reliability of the longitudinal assessment procedures.

The second method, which turned out to be more appropriate and effective, is a non-parametric analysis of pairs, matched for sex, environment, parental education and chronological age as measured in days. Treating the mental scores as dependent variables, the partners were defined as earlier vs later maturing, according to criteria of physical measurements. Subtracting the mental scores of the "later maturing" from those of the assumedly mentally precocious "earlier maturing" partner, sets of positive and negative differences were obtained, which could be tested for the significantly higher incidence of positive differences, indicating the mental superiority of the physiologically more advanced subjects. The statistical method, employed for the purpose of this evaluation, was the non-parametric Bi-nominal and Wilcoxon Matched Pairs Tests.

At the first stages of the study, when only cross-sectional data were available, the criteria of physiological maturation used as independent variables, were: a) standing height in pre-menarcheal and pre-pubertal boys; b) pre- vs post-menarcheal status; c) temporal distance from menarche in post-menarcheal girls, and d) development of pubic hair in pubertal boys.*

In the final data elaboration, longitudinally assessed criteria of physiological maturation were defined by means of the following technique: On the basis of information, supplied by the 6 successive physical examinations, individual growth curves were plotted, depicting in most cases the appearance of the pre-adolescent growth spurt (see Figure 2). On the graphs of the girls, the occurrence of menarche was marked, providing an important cue. For the boys, data on pubic hair development were added, using a five point scale, as designed by Tanner (25). Considering these graphical representations of physical growth as a frame of reference, the "maturational status" of each subject at the date of each of the four mental examinations was defined in terms of one of the following phases of pubertal or pre-pubertal growth:

In girls: AS ** the phase of regular growth preceding the pre-adolescent growth spurt; S -- the phase of the growth spurt; Sd -- the typical phase of growth deceleration preceding menarche. (See Figure 3). P6, P12, P18, etc. are post-menarcheal phases, the number indicating the temporal distance from menarche of the last month terminating half year periods, which were arbitrarily chosen as convenient time units to break down the post-menarcheal period.

In boys: AS -- the phase preceding the growth spurt; S -- the growth spurt; P -- the period after the growth spurt. The numbers 1 to 5 were added to the letters AS and S, indicating the stage of pubic hair development (according to Tanner's scale). The stages 4 and 5 were usually concomitant with S, so that practically most of the S phases were S 3, S 4 and S 5, whereas all AS phases were implicitly AS 1 or AS 2. However pubic hair stage 3 was sometimes preceding the growth spurt, and then written AS 3. When it occurred during the growth spurt, S 3 was chosen as designation. Comparison of the longitudinal data showed clearly that S 3 was a more advanced stage than AS 3. The period after the growth spurt was divided into P6, P12 phases, in a similar was as in girls, although obviously the termination of the male growth spurt was a much less exact dividing line than the occurrence of menarche.**

The matching of the subjects in pairs was carried out in the following way: the population of each sex/grade/environment group was put into rank order according to chronological age, measured in days. Starting with the oldest subject, each subject was paired with the next younger one, being closest to him by age, provided that the "distance of parental education" was "appropriate." That is, parental education was measured

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*The results of these cross sectional comparisons have been tabulated in our Progress Reports of October 1967 and June 1968. They have not been reproduced here, as they have been overshadowed by the longitudinal findings presented in this report.

**Because of the identical initial of the English Post and Pre, the initial of the Latin Ante was chosen to designate "before." In a similar way we decided to abbreviate "pre-pubertal" as "A" and to reserve the letter "P" for "post-pubertal."

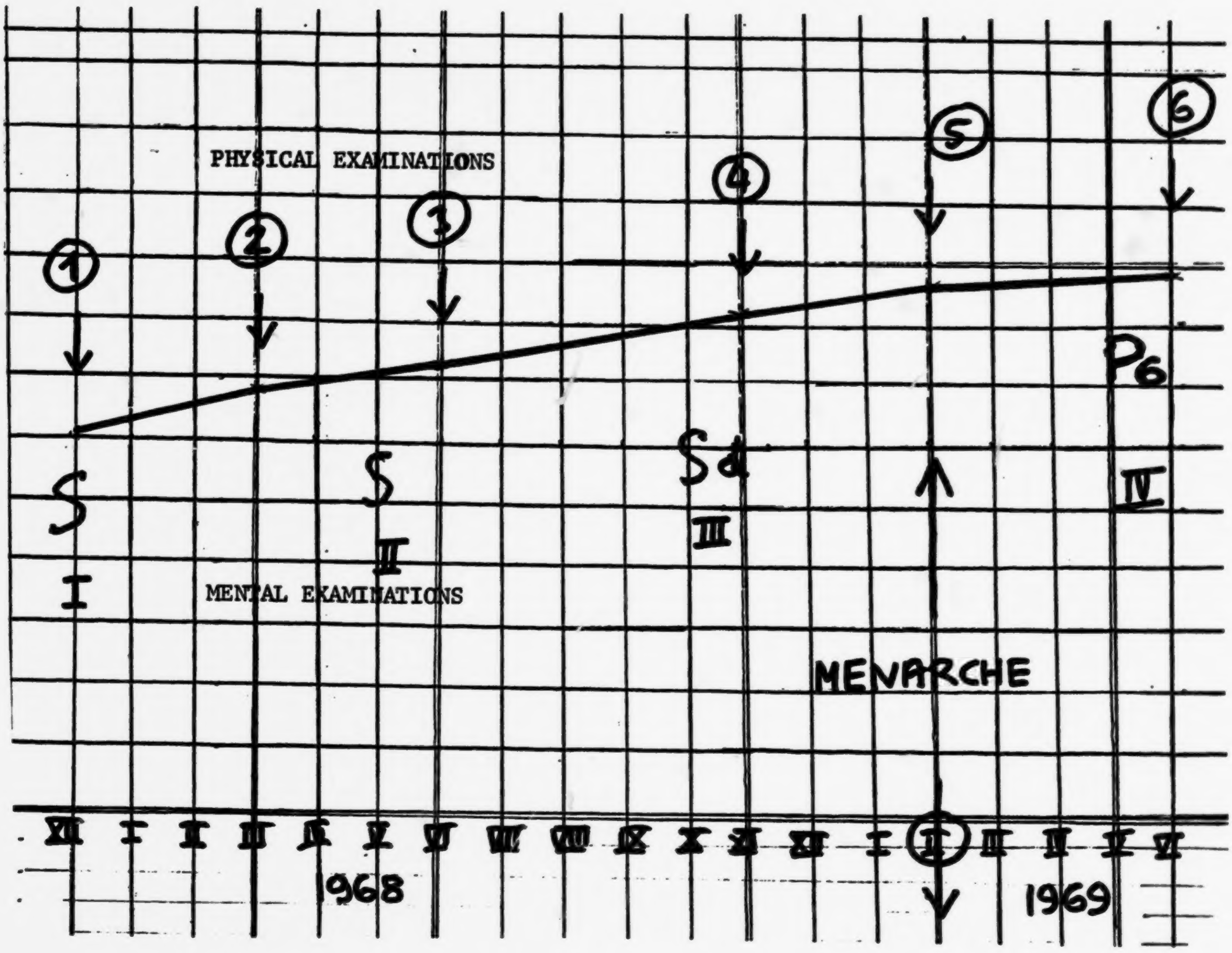

Figure 2
Specimen of Data Elaboration Sheet Depicting Physical Growth of an Individual Girl and Her Maturational "Status" at the Four Mental Examinations

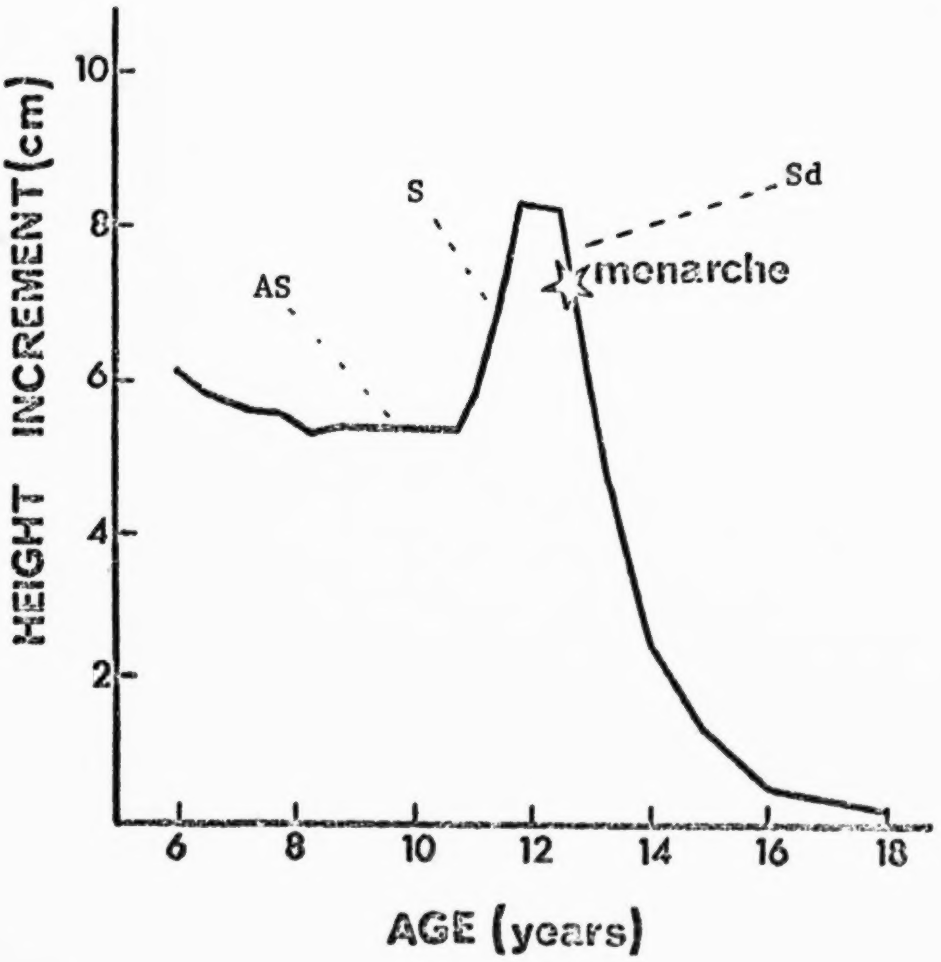

Figure 3
The Female Premenarcheal Growth Phases

on a five point scale (see Table 4). No more than 4 points total distance between the educational level of the two fathers and two mothers were allowed, which in general occurred not too often, as subjects had already been grouped according to three socio-economic levels, thus controlling to large extent parental educational background. If it nevertheless happened, the next closely aged partner was selected.* In case that the two partners seemed to be too similar as to timing of their physiological maturation, the next close subject, showing a more contrasting maturational status, was chosen for pair formation.*

After subjects were matched, earlier vs later maturing partners were defined by comparing the maturational status of each partner at each of the four mental examination dates. This, of course, created four successive "status pairments" or "status constellations" (see Table 6).

Hereafter the information on the physiological maturational status of the paired subjects were fed into the computer program which printed out the differences between the mental raw scores. Table 7 shows a specimen of the original computer output.

The score differences were then statistically evaluated. Initially it was intended to compare all the possible "maturational status constellations."

However this resulted in too small numbers within each cell, and consequently it was necessary to pool the various combinations of constellations and to form "constellation categories." The obviously most meaningful criterion to classify constellations into categories was the differentiation between pre- versus post-pubertal status. This yielded three categories: Both partners are pre-pubertal (Category A/A). The earlier maturing partner is pubertal, while the later maturing one is still pre-pubertal. (Category P/A). Both are pubertal (Category P/P). The fourth combination, earlier pubertal/later pre-pubertal, is logically impossible.

Contrary to tradition, the Sd phase in girls (i.e. the deceleration phase immediately preceding menarche) was considered to be the first pubertal phase (and not the menarche per se). In boys pubic hair stage three was defined as beginning of puberty, irrespective of its occurrence during or before the growth spurt. The resulting trichotomy of maturational constellations into the three categories A/A, P/A and P/P in both sexes is shown on Table 6.

In the final stage of elaboration, the incidence of higher mental achievements on the various tests in the earlier maturing partner vs incidence of such superiority in the later maturing (as well as the incidence of equal performance) were tabulated for each of the 20 scorable test variables within each of the three constellation categories for each of the four mental examinations, given to the 6 sex/environment groups. The significance of these incidences was tested by the non-parametric techniques described above. In addition, attention was paid to the consistency of mental superiority or inferiority of the earlier (or later) maturing partner, appearing throughout the performances on the various tests. (See below, Tables 22ff and pages 59ff).

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* For cross sectional comparisons, a computer program for matching pairs according to the above described criteria was designed and put into use. For the longitudinal matching it became impractical, as for the purpose of determination of early vs late maturing subjects, it would have required the scanning of graphs by rather expensive computer techniques.

TABLE 6

CATEGORIZATION OF MATURATIONAL STATUS CONSTELLATIONS

Boys

Matur. Status Later Mat. Earlier Mat.	AS 1	AS 2	S 3 AS 3	S4	S5	P_6	P12
AS 1	*	*					
AS 2	*	*					
AS 3/ S 3	+	+	#	#	#	#	#
S 4	+	+	#	#	#	#	#
S 5	+	+	#	#	#	#	#
P_6	+	+	#	#	#	#	#
P_{12}	+	+	#	#	#	#	#

Girls

Matur. Status Later Mat. Earlier Mat.	AS	S	Sd	P_6	P_{12}	P_{18}
AS	*	*				
S	*	*				
Sd	+	+	#	#	#	#
P_6	+	+	#	#	#	#
P_{12}	+	+	#	#	#	#
P_{18}	+	+	#	#	#	#

* A/A
+ P/A
# P/P

Table 7

Specimen of Computer Output Showing 4 Maturational Status Constellations of a Matched Pair of an Earlier and a Later Maturing Subject. Their respective mental scores on 20 variables at four examinations are compared and differences between scores are printed out.

```
671522 EARLY      H=1490     B=33     E=33     P=2
671122 LATE       H=1460     B=34     E=33     P=1

     EARLY LATE           1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20

I    Sd    Sd    EARLY   20   0  18   3   6  15   5   5   6   2   1   6   1   8   6   4   5  40  10  20
                 LATE    16   2  19   2   6  15   6   5   3   5   6   2   0   7   9  11   6  39  17  17
                 DIFF     4  -2  -1   1   0   0  -1   0   3  -3  -5   4   1   1  -3  -7  -1   1  -7   3

II   P6    Sd    EARLY   24   0 *** *** ***  13   4   7 *** ***   4   4   0  14  14  10   6 *** *** ***
                 LATE    22   4 *** *** ***  15   4   3 *** ***   3   5   0  13  12   8   6 *** *** ***
                 DIFF     2  -4 *** *** ***  -2   0   4 *** ***   1  -1   0   1   2   2   0 *** *** ***

III  P12   Sd    EARLY   25   1  20   1   6  15   5   1   8   0   5   2   1  10  12   7   3  44   5  32
                 LATE    26   0  17   4   6  16   6   4   6   2   7   1   0   7   9   9   4  32  20  19
                 DIFF    -1   1   3  -3   0  -1  -1  -3   2  -2  -2   1   1   3   3  -2  -1  12 -15  13

IV   P18   P6    EARLY   34   1  23   1   3  18   7   2   8   0   5   2   0  11   2   9   7 *** *** ***
                 LATE    25   7  22   2   3  16   5   2   5   3   5   3   0  14   8  13   5 *** *** ***
                 DIFF     9  -6   1  -1   0   2   2   0   3  -3   0  -1   0  -3  -6  -4   2 *** *** ***
```

RESULTS

Physical growth patterns

Tables 55-59 (Appendix, pages 110-115) and Figures 4-11 (pages 27-34) show the patterns of physical growth in both sexes in the three environments. The culturally disadvantaged are characterized by a conspicuous lag in physical development at the beginning of the study, but surprisingly catch up during what seems to be an intensified pre-adolescent growth spurt. As can be seen on Figure 10, the seasonal effect on height is most pronounced in the female Medium Level sample, in the female High Level sample at the upper grades and in the male High and Medium Level groups at the lower grades. In the Low Level groups it is difficult to trace the seasonal effect, as the sample is relatively small and random fluctuations may cause large deviations. In addition, the already mentioned intensive growth spurt, well observable on the graphs, seems to overshadow all the effects of birth season. On the other hand, there is a considerable precocity in weight in Summer born girls at the upper grades of the High and Low Level population (Table 58 Appendix, page 114).

The patterns of dental development stand in striking contrast to those of skeletal and muscle growth, as reflected in height and weight increments. As can be seen on Tables 56, 59 (Appendix, page 33 and on Figure 11 (page 34) there is definitely no birth season effect. The half a year younger Summer subjects show an expectable lag in dental growth, and the girls are precocious, as well known from normative studies and surveys. A rather surprising finding is the reversal in developmental rates between the three environments: The Lower Level subjects, having the lowest height and weight are dentally the most precocious, whereas the physically advanced High Level students show the slowest dental development. We were unable to find any documentation of these findings in other studies and dental specialists and pediatricians, whom we consulted did not have any prior knowledge on such data. At the moment we thus cannot but interpret the findings at their face value. As dental development has been reported to be related to skeletal growth and the latter is often used as a standard criterion of "organismic development," some reservations must now be made in the light of these findings, especially in view of the later reported results, which show relationships between physical and mental growth, but no correlations whatsoever between dental and intellectual development.

Mental development*

The scores of the mental tests show a general trend of progress by age, as may be expected. In the case of the MILTA Vocabulary, Sentence Completion and Concept Formation, the overall developmental patterns are blurred as for each examination different forms of the test were used namely the two parallel forms of the easier level at examination I and II and the two parallel forms of the next more difficult level at examinations III and IV (See Table 5 on page 18). As no transformation scores for the different levels were available for this test (which was not designed for the purpose of longitudinal explorations) the data were presented in their original format.

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*See Tables 66-99 on pages 116-155.

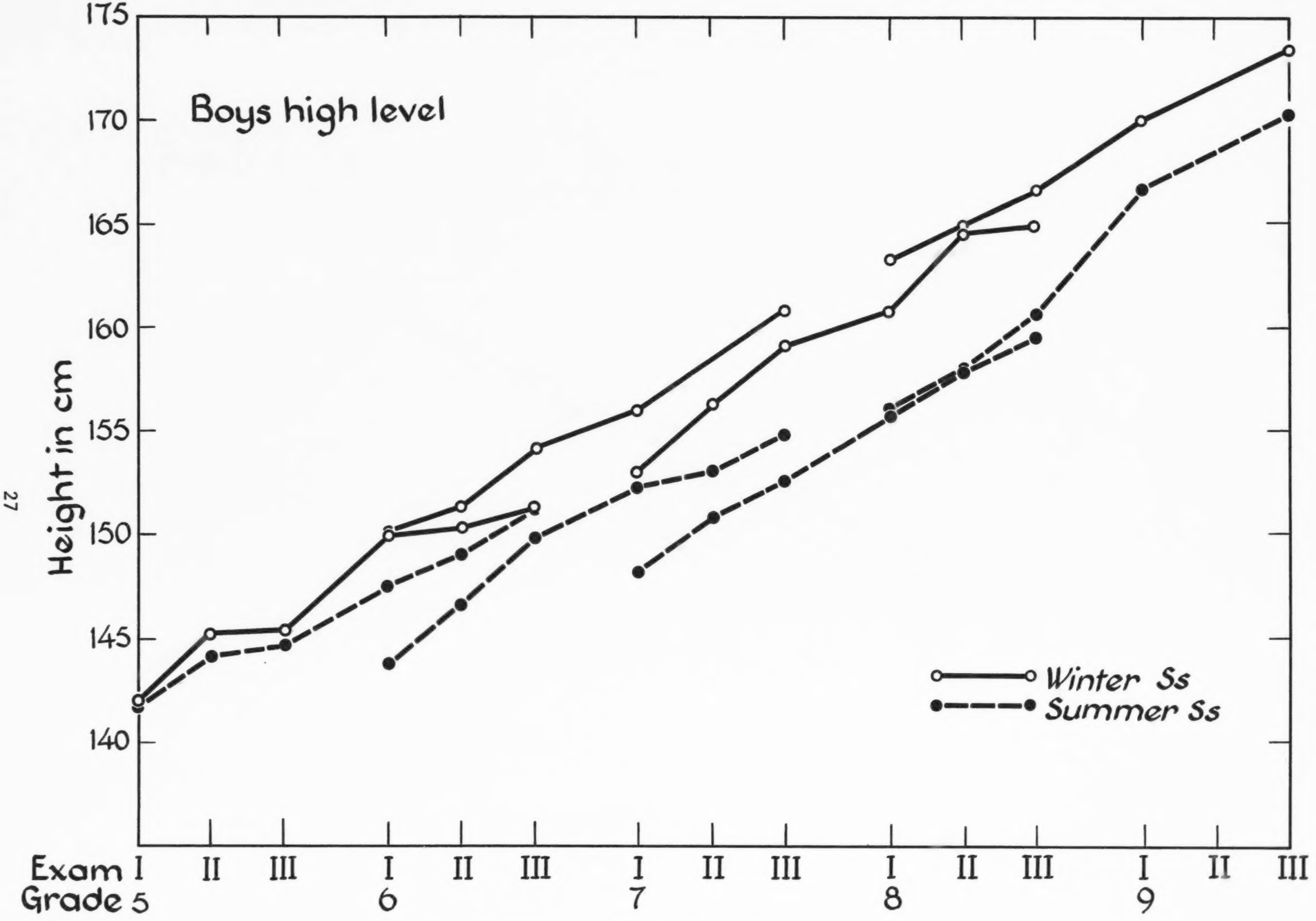


Figure 4

Patterns of Physical Growth

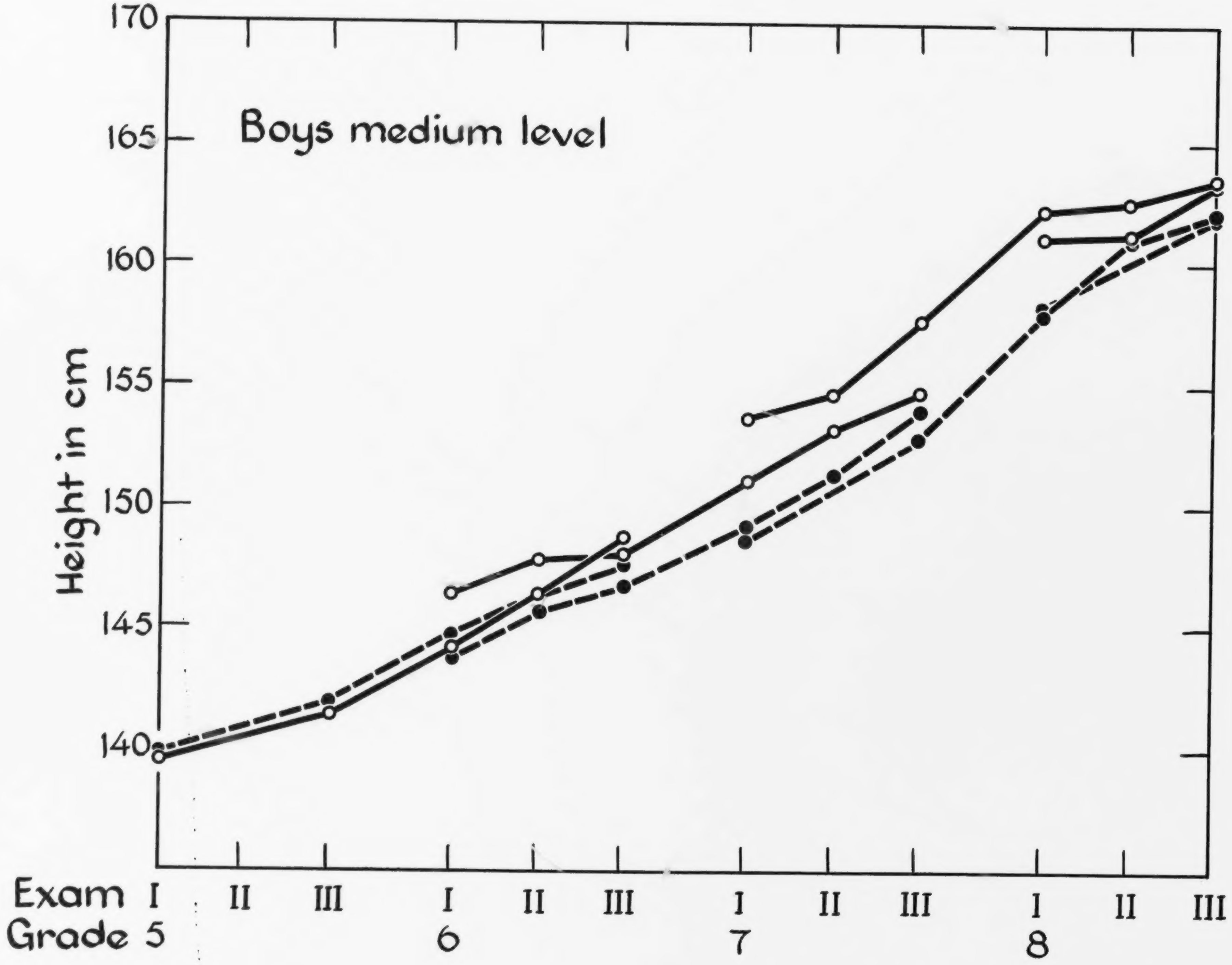


Figure 5

Patterns of Physical Growth

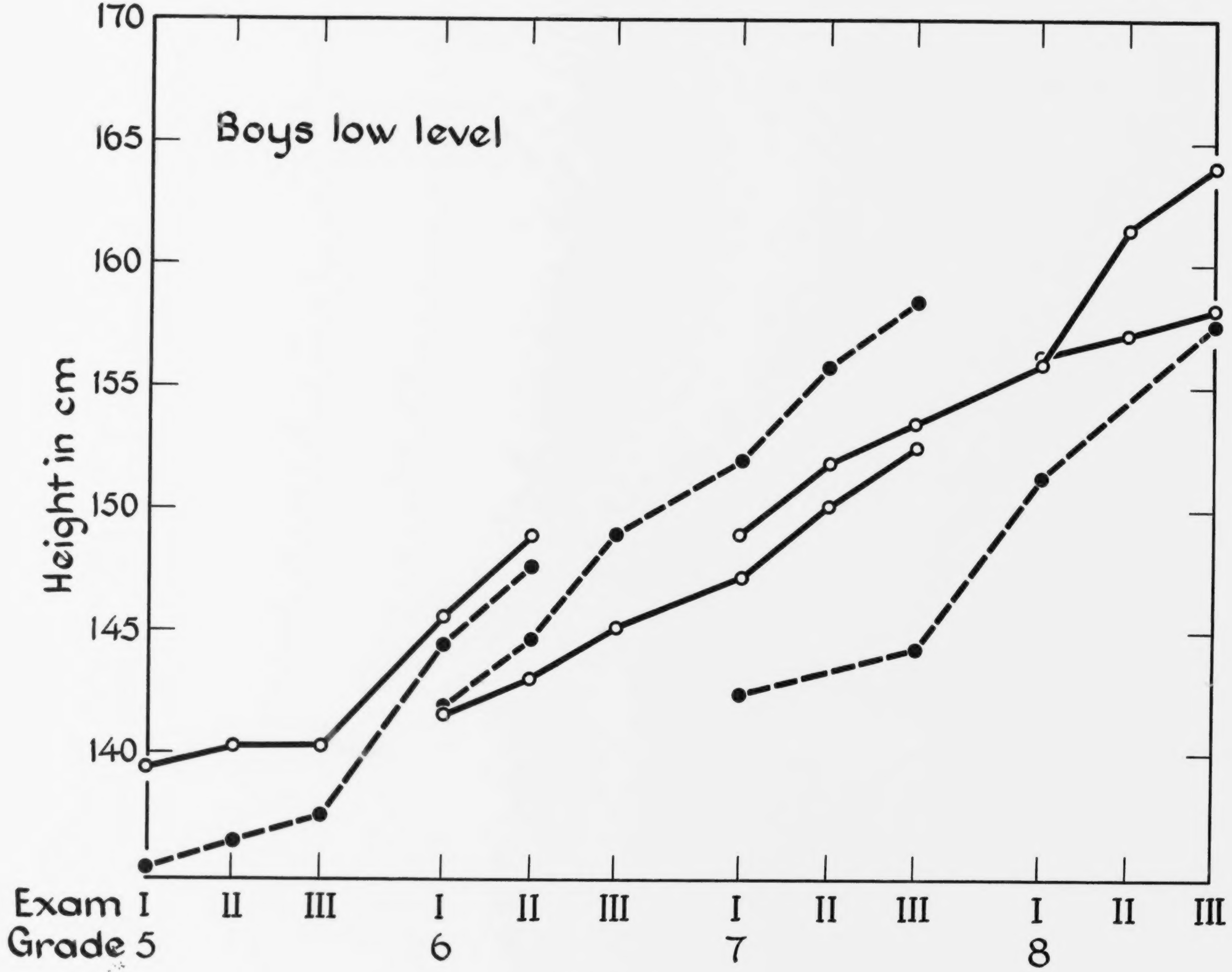


Figure 6

Patterns of Physical Growth

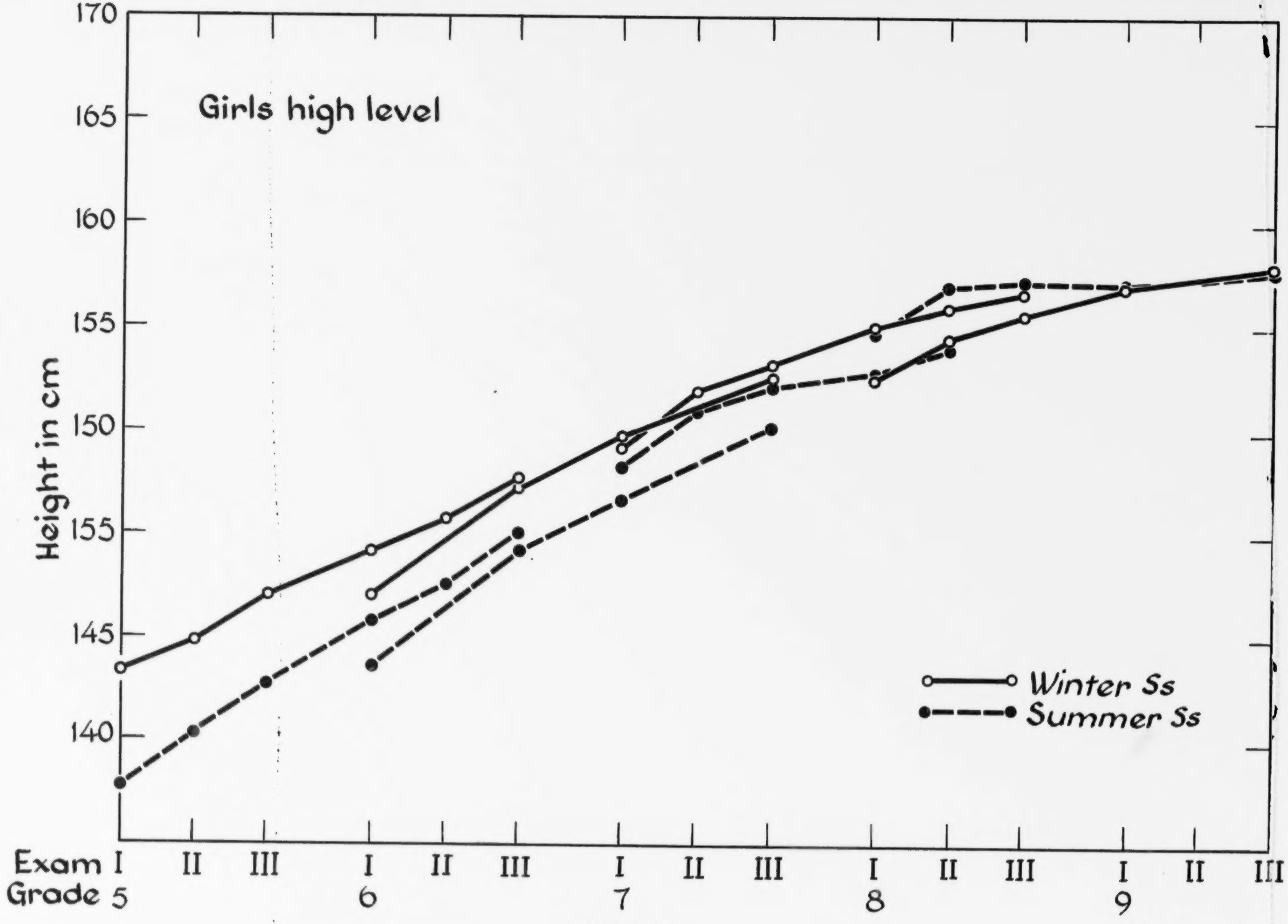


Figure 7

Patterns of Physical Growth

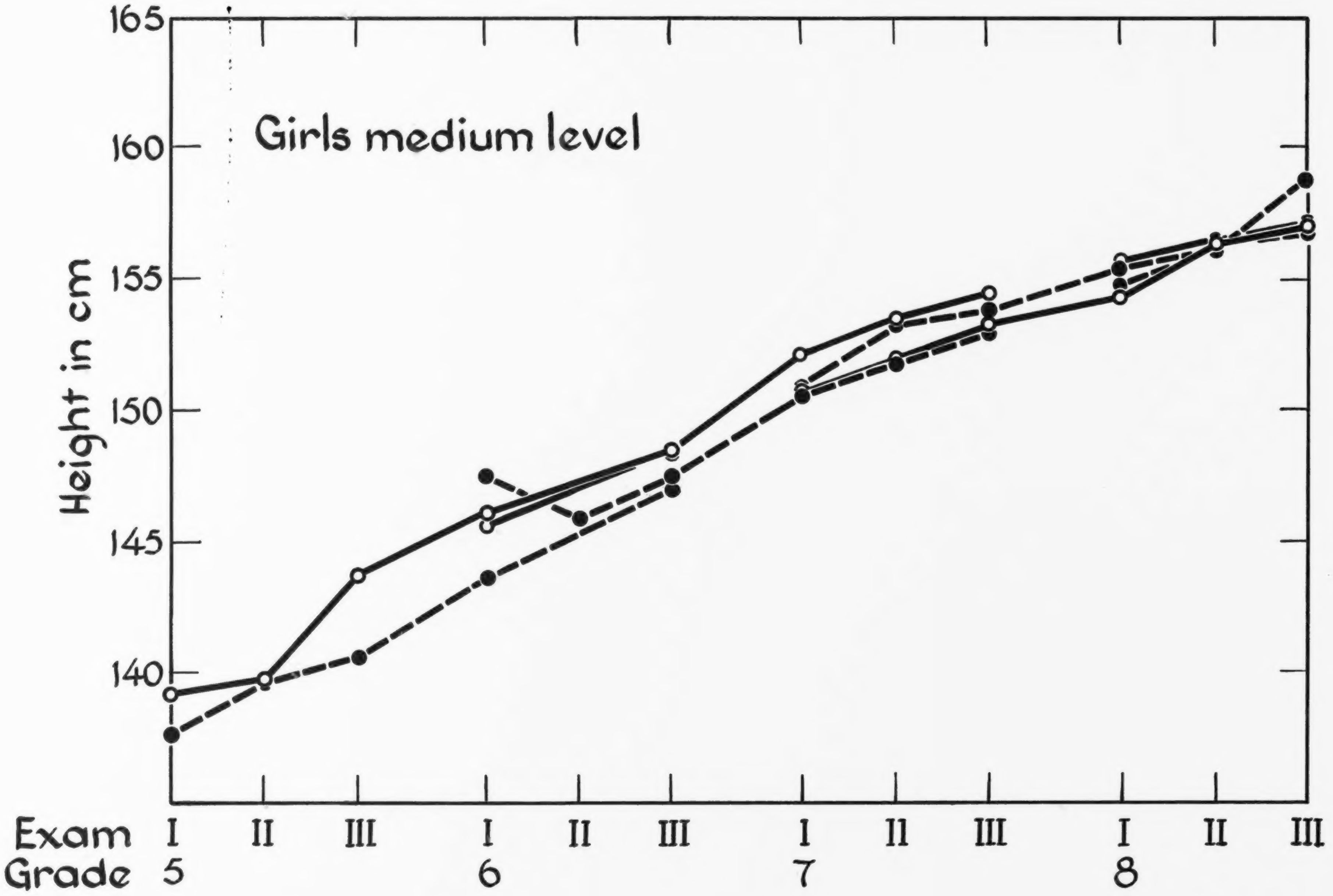


Figure 8

Patterns of Physical Growth

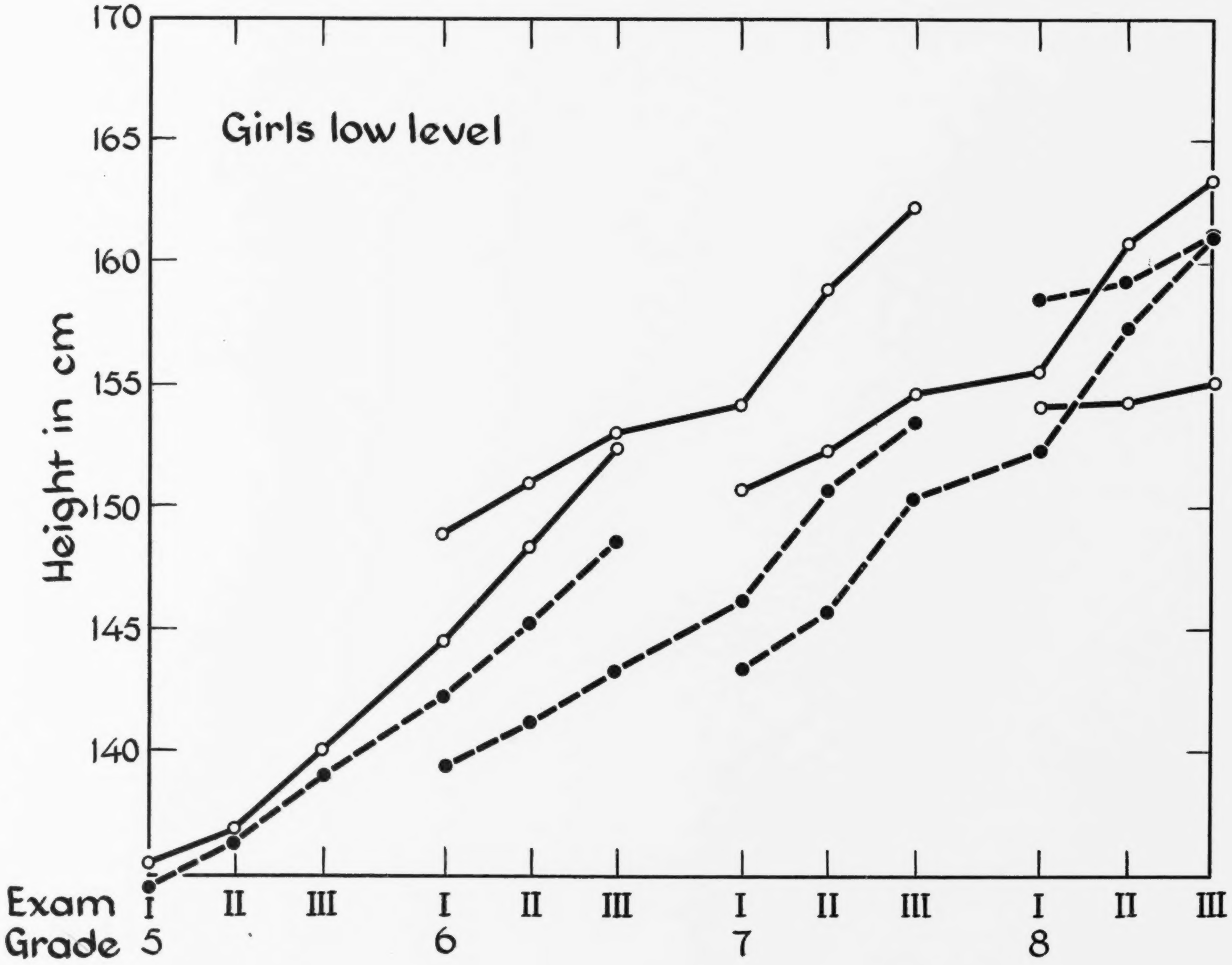
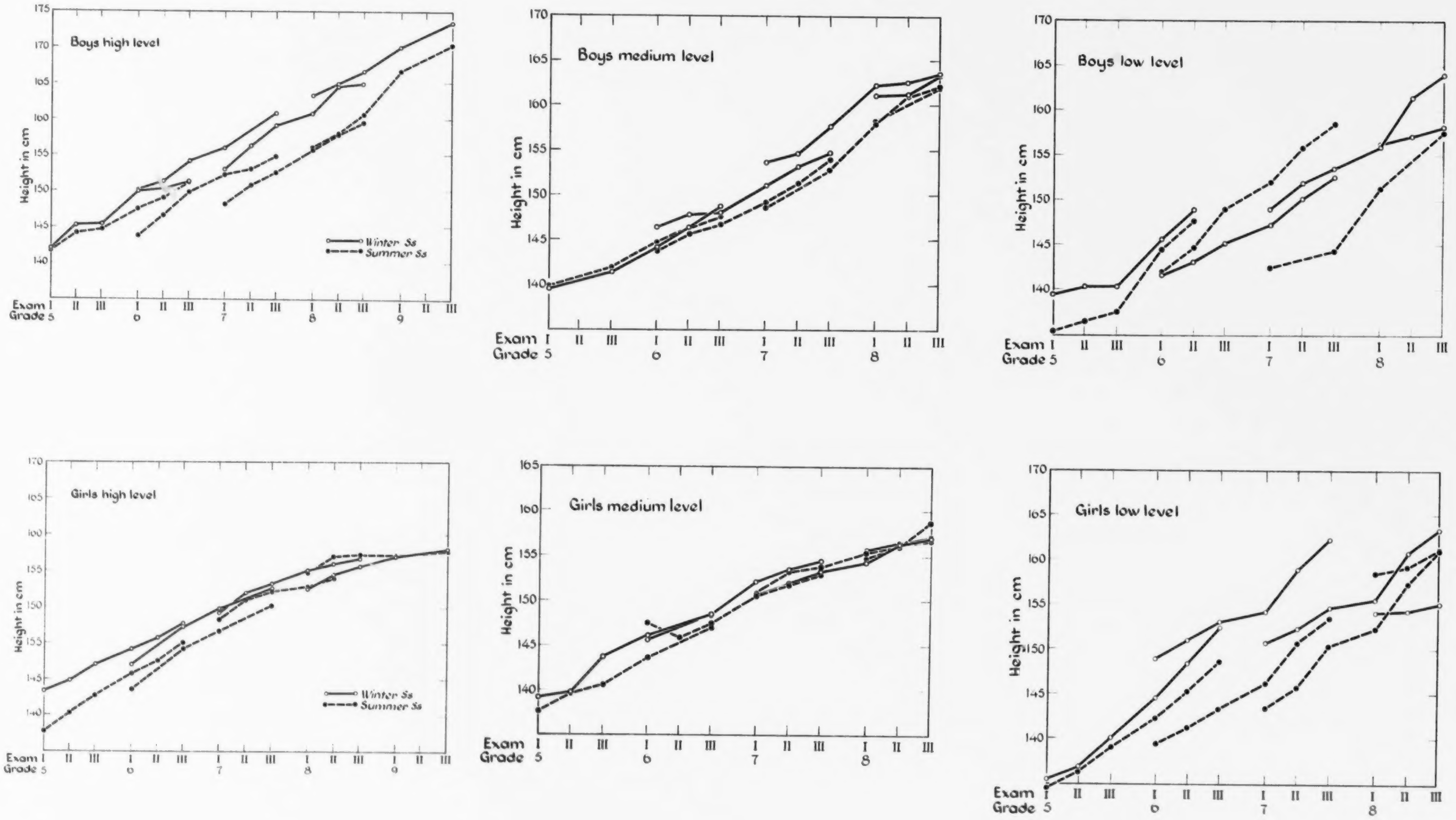


Figure 9

Patterns of Physical Growth

Figure 10

Patterns of Physical Growth
Juxtaposition of Figures 4-9



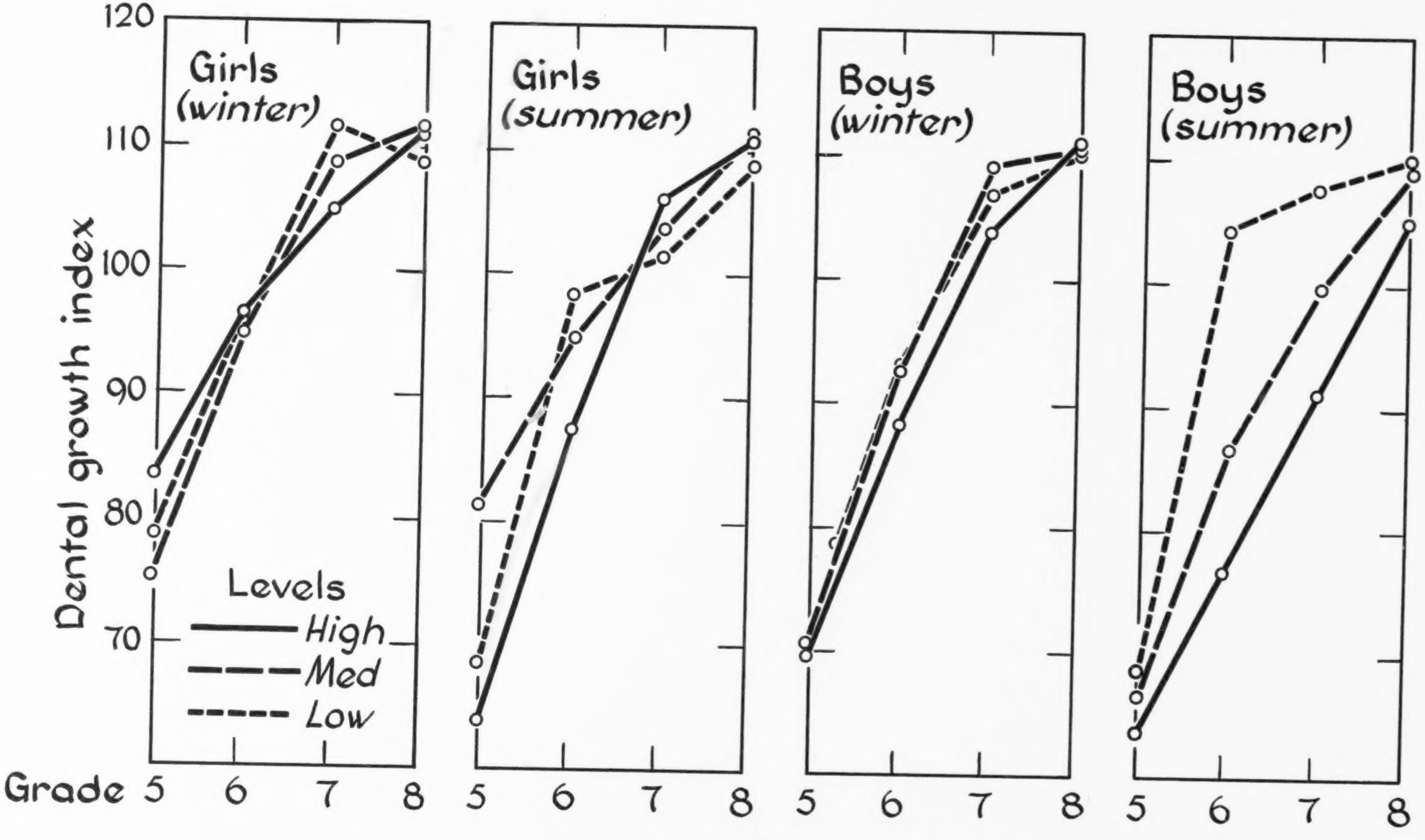


Figure 11

Patterns of Dental Growth

The effect of "birth season" is again manifest in the incidence of higher or equal scores attained by the half a year younger Summer subjects studying in the same grade.*

The seasonal effect appears in all three environments in Performance as well as in Error scores. However, in the case of Directional Errors we abstained from searching for seasonal effects as these scores reflect "half way solution," and their weight is ambiguous.

It will be noted that Directional Errors in Verbal Analogies I and in Questionnaire of Deductive Reasoning II show tendencies of curvilinear developmental patterns, with the exception of the High Level students of both sexes on Verbal Analogies. This would be expected, and demonstrates the existence of a transitory stage of as yet "incomplete formal reasoning," where the logical structures of the problem are already understood, but their directional aspects still confused.

An important finding emerging from the comparison of mental development in the three environments is a striking "mental growth spurt" in the culturally disadvantaged boys, who, although performing conspicuously low (as may be expected) at the beginning of the study, tend to catch up fairly well at the later examinations and sometimes attain the level of the medium group. Interestingly, this does not happen on the MILTA tests, which continue to reflect--possibly their predominantly scholastic and not truly intellectual--lag of achievement on verbal tests.

No such mental spurt occurs in the female sample, where the culturally disadvantaged girls remain fairly below the medium level throughout the longitudinal follow-up.

Further evidence on the effect of birth season

The most convincing evidence on the effect of birth season on physiological development at adolescence is the difference in the age at menarche in Winter and Summer born subjects. As can be seen on Table 8, Summer born girls of the High Level group have a significantly lower age at menarche (i.e. are organismically precocious) than those born in the Winter season. No such differences show up in the Medium Level population, but in the Lower Level girls, the difference is again manifest,

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*Although theoretically it would be feasible to estimate the statistical significance of the birth season effect by computing t-tests between the means of the summer group and between the means of the winter group of the same class tested half a year earlier, it would not be possible to control the intervention of the following factors: the fact that the summer group would have half a year more scholastic experience; that not identical but parallel forms of the same test were used for the comparable examinations; the half a year longitudinal distance in testing time would not correspond to the average birthday differences of the compared groups. It seems thus, that by trying to test for statistical significance no essential additional information would be gained besides the fact, obvious by inspection, that while there is a definitive progress by age in test achievement, the half a year younger Summer subjects do show in many instances unexpected equal or higher scores. There is no doubt that the seasonal effect per se and its statistical significance could be explored by specially designed testing procedures, carefully controlling the factors which have been enumerated before. This however was impracticable in the context of this study which originally was designed for a different purpose.

TABLE 8

MAIN STUDY

AGE AT MENARCHE IN WINTER VERSUS SUMMER BORN GIRLS IN THREE ENVIRONMENTS

Environment	Season	Age at Menarche 12 or less	12;01 to 12;06	12;07 to 13;00	13;01 & above	N	M (years)	SD (months)
High	W	1	5	8	17	31	13;02*	8
	S	12	9	11	7	39	12;06*	8
Medium	W	9	8	21	20	58	12;09	8
	S	6	7	16	13	42	12;08	9
Low	W	0	3	3	14	20	13;04	9
	S	3	2	3	6	14	12;08	10

	M (years)	SD (months)	N
Total High Level	12;09	9	70
Total Medium Level	12;09	8	100
Total Low Level	13;01	10	34
Total Winter	13;00	9	109
Total Summer	12;07	9	95

*Difference significant at .01 level as assessed by chi square.

although not significant. On the other hand, in the High Level subjects of the Pilot sample, significant differences are again apparent (See Table 9). Table 9 also shows the mental precocity of the Summer born High Level girls of the Pilot sample, which is also evident in the Main study in the same type of population, especially at the upper grades (See Tables 80-99 Appendix, pages 136ff). The mental and physical precocity of the Summer born High Level girl has thus been demonstrated in two independent samples.

The effect of birth season must not necessarily be linked to half year periods, which were arbitrarily used for statistical convenience. Actually an attempt was made to elucidate, whether the relative precocity of the Summer subjects and relative retardation of Winter subjects is related to specific months or quarters. However, because of the extremely small numbers which remain in cells, after the sample has been stratified by months or quarters of birth, no clear-cut results could be obtained.

TABLE 9

EFFECTS OF BIRTH SEASON

Pilot Sample, Girls, High Level

Positive sign indicates the incidence of higher values in half a year later born Summer subjects matched with the half a year earlier born Winter subjects of the same grade for chronological age at date of testing. That is, winter subjects were tested half a year earlier.

GROUP		(-)	(+)	P
Pre-menarcheal Grade 6	Height	4	11	.06
	Raven	2	12	.01
	Milta Concepts	5	7	N.S.
	Milta Analog.	3	7	.17
Pre-menarcheal Grade 7	Height	6	2	.15
	Raven	6	3	N.S.
	Milta Concepts	4	4	N.S.
	Milta Analog.	3	7	.17
Post-menarcheal Grades 6 and 7	Age at Menarche	5	1	.11
	Raven	2	7	.09
	Milta Concepts	1	7	.04
	Milta Analog.	2	5	N.S.
Post-menarcheal Grade 8	Age at Menarche	10	3	.05
	Raven	5	8	N.S.
	Milta Concepts	4	8	N.S.
	Milta Analog.	6	6	N.S.

COMBINED GROUPS

GROUPS		(-)	(+)	P
Pre 6 Pre 7	Height	10	13	N.S.
	Raven	8	15	.11
	Milta Concepts	9	11	N.S.
	Milta Analog.	6	14	.06
Post 6 and 7 Post 8	Age at Menarche	15	4	.01
	Raven	7	15	.07
	Milta Concepts	5	15	.02
	Milta Analog.	8	11	N.S.
All four groups combined	Raven	15	30	.05
	Milta Concepts	14	26	.06
	Milta Analog.	14	25	>.05 <.1

Findings based on parametric correlations between physical and mental growth data

The most remarkable general finding is the fact, that the dichotomization of the sample by season of birth (January to June vs July to December) leads to the emergence of substantial correlations between measures of physical growth and mental tests, whereas in undivided age/grade groups these correlation coefficients are close to zero. (See Appendix, Tables 51-53 on pages 100-107). However even these "birth season specific" correlations seem to be additionally affected by parental educational and socio-economic level. Furthermore, in some instances the relationships are significantly negative and also alternate from one direction to the other within the four years growth cycle, encompassed by this investigation. On the other hand, the size and direction of most of these correlations are consistent throughout the different tests, given to the same grade/season/environment group. They also reappear retrospectively and prospectively in relation to physical measurements taken before and after the mental testing, which may be considered as evidence of their reliability and validity.* As can be seen on Tables 100-111 (Appendix, pages 158-169) the most pronounced relationship between physical and mental growth shows up in the High Level population. On the other hand the sample of the Low Level subjects, after being subdivided by sex and birth season, is split into groups of extremely small size, and the significant correlations, which nevertheless appear in some cells, may be well due to chance.

We proceed now to analyze the individual age/season environment groups.**

In the sample of High Level, Winter born boys there is a definitive positive relation between physical and mental growth at the fifth and eighth grades. These two phases of positive relationships are interrupted by a short interlude*** of negative correlations at the end of the sixth and the beginning of the seventh grade. (Table 10). The correlational patterns in the Summer subjects are similar, but seem to be shifted by half to one year, which would be plausible in the light of their half year lower chronological age. The "interlude" of negative correlations is shorter, located at the seventh grade and features only two instances of negative correlations (as against seven in the Winter group (See Table 11).

In the Winter born, Medium Level boys, the positive correlations at both ends of the investigated developmental span are scarcer than in the high level boys, on the other hand the negative interlude is more pronounced and more extended in time. Besides, achievements on the Numerical Analogies test are negatively correlated with physical growth also at the fifth and sixth grades, whereas at the seventh grade contradictory results are obtained for the two--i.e. the initially tested and followed up--samples within the same age/grade group (Table 11).

---

*As to the possibility of chance correlations occurring among so many combinations of relationships, it should be borne in mind that we are essentially dealing with a small number of basic variables, each represented by a number of highly intercorrelated scores and measurements. That is, physical growth is measured by intercorrelated measurements of height, weight, pelvic and shoulder width etc, mental development by intercorrelated scores of a test battery purposefully selected to assess a specific function, namely formal reasoning. (See Appendix, Tables 51-53, pages 100-107).

**In order to facilitate the overview of data only the directions of the overall relationships have been tabulated in the text, but detailed information can be obtained by reference to fully tabulated correlations in the Appendix.

***An attempt will be made to explain the appearance of these negative correlations in the light of our findings obtained with the matched pairs technique, which will be presented later.

In the Summer born, Medium Level boys, there is a positive relationship at the fifth grade (again with the exception of Numerical Analogies), followed by negative correlations throughout the seventh and eighth grades.

The direction of correlations with Directional Errors in the Questionnaire of Deductive Reasoning II may be interpreted both ways, as these scores are meaningful as errors, as well as measured of achievements, reflecting half way solutions (Tables 12, 13).

As already stated, results in the low level population can be hardly given any interpretation in the light of the small number of subjects. It seems though that the predominant tendency of relationships is negative, i.e. the physically more precocious lower class boy tends to score lower on mental tests. The overall patterns in Winter and Summer subjects of this subsample are similar (Tables 14, 15).

In the female High Level sample, the pre-pubertal and close to pubertal age groups, namely grades 5 and 6 tend to show positive correlations between mental and physical growth. This finding is similar in the two seasonal groups. On the other hand, there is a striking seasonal discrepancy between the pubertal Winter and Summer subjects, i.e. Winter subjects show a negative relationship between their mental and physical development, whereas in Summer subjects this relationship continues to be positive (Tables 16, 17).

As to the emergence of negative correlations two explanations are possible: a) As the physical growth spurt ceases with the advent of menarche, the pre-pubertal physiologically and mentally less mature but still fast-growing girl may surpass her menarcheal partner in height and weight, which is liable to cause a negative correlation. b) The post-menarcheal girl may remain physically precocious in relation to her pre-menarcheal peer, but the pre-menarcheal physically less developed girl by virtue of being still in a period of an intensive mental growth spurt, may surpass her menarcheal age mate intellectually, which again would result in an inverted relationship. Inspection of our growth data indicated that in most cases the post-menarcheal girl remains physically precocious in relation to earlier maturing girls matched for chronological age so that the second alternative seems to be the more plausible. This is also supported by further evidence, which will be reported later, in the context of our non-parametric analysis.

The discrepant findings between the Winter and Summer subjects might be attributed to the interference of a seasonal factor, causing not only the well documented mental and physical precocity in the summer born high level girl, but also possibly stimulates her pre-adolescent mental growth spurt well beyond the advent of menarche so that the pre-pubertal age mate cannot "catch up" with her intellectually, which seems to happen in the case of Winter born subjects.

In the medium population of girls, the Summer subjects--similar to the High Level Summer subjects--show consistent positive correlations between mental and physical growth, which however are limited to Verbal Analogies, Concept Formation and Raven. In the group of Winter subjects, no relationship between mental and physical growth shows up (Tables 18, 19).

The results in the female Low Level sample are again inconclusive, as the population is small and the significant correlations are scarce and possibly no more than products of chance. Still, there may be some consistency in the seasonal discrepancy, which appeared in the High and Medium Level female groups, in that there is a tendency for throughout positive relations in the Summer subjects, as against the emergence of mixed directions of relationships in the Winter sample.(Tables 20, 21).

TABLE 10

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

BOYS, HIGH LEVEL, WINTER SUBJECTS*

	5		6				7				8				9	
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA		+		(+)						+		(+)				
*NA (SE)		+		(+)						(+)		+				
VA I.																
VA I. (DE)																
VA I. (SE)																
VA II (SA)		+		+		=		(=)				+				
VA II (TA)																
VA II (SE)																
QDR I		+		(+)		(=)										
*QDR I (SE)		+		+												
QDR II		+								(=)		(+)				
*QDR II (DE)												(+)				
QDR II (SE)																
M/VOC				(+)												(=)
M/SC		+		(+)				(=)								(=)
M/ANAL												(+)				
M/CON										+		(+)				(=)
Raven		+		+		=		=		(+)						
Raven (SE)																
GSAT																

LEGEND:

=	indicates negative correlation
= +	predominantly significant correlations
(=)(+)	partly significant or nearly significant correlations
*	sign of correlation has been reverted because relating to error scores

*See Tabulated Data on pages 158-169.

TABLE 11

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

BOYS, HIGH LEVEL, SUMMER SUBJECTS*

	5		6				7				8				9	
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA				(+)						(+)				+		+
*NA (SE)		(=)		=		(+)				(+)		(+)		+		(+)
VA I.																
VA I. (DE)																
VA I. (SE)																
VA II (SA)						+								+		
VA II (TA)																
VA II (SE)																
QDR I														+		
*QDR I (SE)														+		
QDR II		=				(+)										
*QDR II (DE)						(+)		(+)						+		(+)
QDR II (SE)																
M/VOC								(+)				+		+		(+)
M/SC		(+)				(+)				(=)				+		
M/ANAL										=				(+)		
M/CON						(+)										
Raven				(+)								(+)				
Raven (SE)																
GSAT																

*See tabulated data on pages 158-169.

TABLE 12

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

BOYS, MEDIUM LEVEL, WINTER SUBJECTS*

	5		6				7				8				9	
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA		=		=		(=)				+						
*NA (SE)				=				=								
VA I.				+												
VA I. (DE)								=								
VA I. (SE)																
VA II (SA)												(=)		+		
VA II (TA)						(+)						(=)		+		
*VA II (SE)												(=)		+		
QDR I								(=)				(=)		+		
QDR I (SE)																
QDR II		+		(+)						(=)		=		(=)		
*QDR II (DE)		+		(+)				(=)				(=)				
*QDR II (SE)		+		+												
M/VOC																
M/SC																
M/ANAL														(+)		
M/CON				+						=				+		
Raven																
Raven (SE)																
GSAT																

*See tabulated data on pages 170-181.

TABLE 13

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

BOYS, MEDIUM LEVEL, SUMMER SUBJECTS*

	5		6				7				8				9	
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA		(=)		(=)						(=)		(=)				
NA (SE)																
VA I.		(+)		+								(=)				
VA I. (DE)																
VA I. (SE)		+		+												
VA II (SA)		(+)								=		(=)				
VA II (TA)		(+)								=		(=)		(=)		
*VA II (SE)		+				(=)				(=)		=		=		
QDR I								(+)		=				(=)		
QDR I (SE)																
QDR II																
*QDR II (DE)						(=)				(=)		=				
*QDR II (SE)		(+)		+		(+)		=		(=)		=				
M/VOC																
M/SC		+								(=)		=				
M/ANAL										(=)		=				
M/CON		(+)				(=)				(=)		=				
Raven																
Raven (SE)																
GSAT																

*See tabulated data on 170-181.

TABLE 14

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

BOYS, LOW LEVEL, WINTER SUBJECTS *

		5		6				7				8				9
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA		(=)						(=)				(+)				
*NA (SE)				(+)								+				
VA I.																
VA I. (DE)																
VA I. (SE)																
VA II (SA)																
VA II (TA)																
VA II (SE)																
QDR I																
QDR I (SE)																
QDR II		(=)		=	=			(+)								
QDR II (DE)		(=)		=				+				(+)				
QDR II (SE)				=				(+)								
M/VOC				=					=			(=)				
M/SC								(=)				(=)				
M/ANAL																
M/CON																
Raven																
Raven (SE)																
GSAT																

*See tabulated data on pages 182-189.

TABLE 15

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

BOYS, LOW LEVEL, SUMMER SUBJECTS*

	5	6		7		8		9
Grade	I II	III IV	I II	III IV	I II	III IV	I II	III IV
NA			(=)			=		
NA (SE)								
VA I.								
VA I. (DE)								
VA I. (SE)								
VA II (SA)								
VA II (TA)								
VA II (SE)								
QDR I				(=)				
QDR I (SE)								
QDR II	=	(=)	=	=				
QDR II (DE)	+		+	=	+			
*QDR II (SE)		=		=	=			
M/VOC						=		
M/SC						=		
M/ANAL								
M/CON								
Raven		(=)	+		=			
Raven (SE)								
GSAT								

*See tabulated data on pages 182-189.

TABLE 16

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

GIRLS, HIGH LEVEL, WINTER SUBJECTS*

Grade	5	6		7		8		9
	I II	III IV	I II	III IV	I II	III IV	I II	III IV
NA	+	=			(=)		=	
*NA (SE)		(+)					=	
VA I.								
VA I. (DE)								
VA I. (SE)		+						
VA II (SA)	+		(=)		=	(=)	=	(=)
VA II (TA)		(+)		(=)	=	=		=
*VA II (SE)	+	+		=	=	=	=	=
ODR I		(=)				(=)		
QDR I (SE)								
QDR II		(+)	+	(=)	=	=		
*QDR II (DE)			+	(+)	(=)		=	
*QDR II (SE)		+		(=)		=		
M/VOC					=	=	=	=
M/SC	+					=	=	(=)
M/ANAL				(=)		=		
M/CON					=	=		
Raven	+	(+)			(=)		(=)	
*Raven (SE)		(+)			=		(=)	
GSAT		(+)				=		

*See tabulated data on pages 190-205.

TABLE 17

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

GIRLS, HIGH LEVEL, SUMMER SUBJECTS*

	5		6				7				8				9	
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA								(+)		(+)				(-)		(+)
*NA (SE)						(=)										(+)
VA I.																
VA I. (DE)																
VA I. (SE)						+										
VA II (SA)																
VA II (TA)																
VA II (SE)																
ODR I				(=)		(+)										
*QDR I (SE)																
QDR II				(=)				(+)		+		+				+
*QDR II (DE)				(+)		+		(+)		+		(+)				(+)
QDR II (SE)																
M/VOC								(+)		+		+				
M/SC						+		(+)		(+)		(+)				(=)
N/ANAL								(+)		+		+				
M/CON								(+)				(+)		=		
Raven		(=)														
*Raven (SE)														(=)		
GAST								(=)								(=) (+)

*See tabulated data on pages 190-205.

TABLE 18

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

GIRLS, MEDIUM LEVEL, WINTER SUBJECTS*

	5		6				7				8				9	
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA																
NA (SE)																
VA I.																
VA I. (DE)																
VA I. (SE)																
VA II (SA)																
VA II (TA)										=				=		
VA II (SE)																
QDR I																
QDR I (SE)																
QDR II																
*QDR II (DE)										(+)						
QDR II (SE)																
M/VOC																
M/SC																
M/ANAL																
M/CON		(+)				+						(+)				
Raven																
*Raven (SE)						=										
GSAT																

*See tabulated data on pages 206-210.

TABLE 19

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

GIRLS, MEDIUM LEVEL, SUMMER SUBJECTS*

		5			6				7				8			9
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA																
NA (SE)																
VA I.																
VA I. (DE)																
VA I. (SE)																
VA II (SA)				(+)	+		+					(+)				
VA II (TA)					+		+					(+)				
VA II (SE)																
QDR I																
QDR I (SE)																
QDR II																
QDR II (DE)																
*QDR II (SE)									+							
M/VOC																
M/SC																
M/ANAL																
M/CON		(+)			+		+									
Raven																
*Raven (SE)		(+)			(+)		+		+			(+)				
GSAT																

*See tabulated data on pages 206-210.

TABLE 20

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

GIRLS, LOW LEVEL, WINTER SUBJECTS*

Grade		5		6				7				8				9
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA										(+)						
NA (SE)																
VA I.		+														
VA I. (DE)																
VA I. (SE)																
VA II (SA)																
VA II (TA)																
VA II (SE)																
QDR I																
QDR I (SE)																
QDR II						(=)						(+)				
QDR II (DE)																
QDR II (SE)																
M/VOC				(+)						+		(=)				
M/SC																
M/ANAL												(+)	+			
M/CON												(=)				
Raven																
Raven (SE)																
GSAT																

*See tabulated data on pages 211-215.

∿

TABLE 21

TRENDS OF RELATIONSHIPS BETWEEN MENTAL AND PHYSICAL GROWTH

GIRLS, LOW LEVEL, SUMMER SUBJECTS*

	5		6				7				8				9	
Grade	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
NA		+				(=)						(+)				
NA (SE)																
VA I.																
VA I. (DE)																
VA I. (SE)																
VA II (SA)																
VA II (TA)																
VA II (SE)																
QDR I																
QDR I (SE)																
QDR II		(+)														
QDR II (DE)																
QDR II (SE)																
M/VOC				(+)												
M/SC																
M/ANAL												+				
M/CON		(+)		(+)								(+)				
Raven																
Raven (SE)																
GSAT																

---

*See tabulated data on pages 211-215.

Non-parametric analysis of matched pairs

This method, which has been described in detail before, enables us to test the basic developmental hypothesis of this study, namely: 1) There is a general relationship between organismic growth and mental development (irrespective of age and developmental stage), 2) the relationship between organismic maturation and mental development is "phase specific" and occurs only during certain critical periods, 3) assuming that a decisive phase of functional brain maturation precedes the activation of the gonads--which marks the beginning of puberty proper--a possible mental growth spurt should be located at the threshold of puberty.

Having assessed the incidence of mental superiority in the earlier maturing partner of matched pairs, as specified above (page 23) the hypothesis and its parts could now be tested in the following way: 1) If general organismic maturation is related to mental development, then the overall mental performances of the earlier maturing partners should be superior irrespective of their "maturational status constellation." 2) If there is a critical phase of organismically determined precocity in mental development (in other words, if a maturationally stimulated mental growth spurt occurs), the superiority of the earlier maturing partner should predominantly appear during one or two "maturational status constellations."

a) If the period closely preceding puberty* is a crucial factor stimulating mental growth the most pronounced mental precocity of earlier maturing subjects should be manifest during status constellation P/A or during the combined status constellations P/A and P/P.

b) If the mental growth spurt is typically pre-pubertal, such precocity should conspicuously show up in constellation A/A.

These possibilities will now be examined by inspecting the findings for the various grade/environment groups of both sexes.

In the High Level girls a mental growth spurt seems to occur during the pre-pubertal and close-to-pubertal stages of physiological maturation. As can be seen on Tables 22-25 the most pronounced mental superiority of earlier maturers appears in maturational status constellations P/A and P/P. Furthermore, it will be noted, that the pairs of eighth graders, who seem to have passed the "critical phase" tend to suppress the relationship. That is, in examination I, where they are exclusive representatives of constellation P/P, the relation between mental and physical growth is weak, except for the MILTA analogies. On the other hand, in examination II, where for technical reasons (see above, page 17) the eighth graders were not tested but with the MILTA, the younger sixth and seventh graders, most of them supposed to be in the "critical mental growth period," raise the relationship conspicuously. Finally, in examination IV, when the chronological age of the sample is highest and only few subjects still being in the growth spurt stage are left, the relation vanishes. (Examination III shows a transitional pattern between examination II and IV.)

However, there is further evidence that in the High Level female sample population the mental growth spurt is "pre-pubertal and close-to-pubertal" and not occurring during puberty proper. In the High Level girls of the Pilot Sample, (Tables 26, 27) which may be considered as a cross validation group, a definitive mental precocity of early maturers shows up in the first examination which gradually vanishes throughout the longitudinal follow-up, as the majority of girls outgrow constellations A/A and attain maturational status P/P. In the eighth graders of the same sample, who are obviously organismically older, no relationship exists from the beginning. In the Medium Level girls of the Pilot Study, who are physiologically more mature already at the 6th and 7th grade than their High Level counterparts, the relationship is again absent. However this may be accounted for in part by the somewhat lower socio-economic background of this group.

---

*That is, the growth deceleration phase before the menarche in girls and the phase of intensified pubic hair growth (pubic hair stage 3) in boys, which is a definitive sign that pubertal growth has started. Our "operational definition" of puberty employed in the matched pairs analysis refers to an organismically somewhat earlier phase in boys than in girls.

Table 30, also referring to the High Level Pilot Sample, shows that in post-menarcheal girls at grades 6 and 7, who are still close to their menarche (Mean temporal distance from menarche is 2.4 months) there is a significant correlation between mental scores and age at menarche, i.e. the negative correlation indicates that the girl with the lower menarcheal age at menarche, who is organismically precocious, is mentally superior. However, this relationship fails to appear in the post-menarcheal eighth graders (Mean temporal distance from menarche is 9.0 months) as they seem to have passed the "critical phase" of the mental growth spurt.*

These findings seem to support our interpretation of the negative correlations between mental and physical growth in the High Level Winter born girls in grades 7 and 8. (Above, pages 40 ff). That is, they seem to be due to the fact that the late maturers, being still in the mental growth phase, temporarily surpass the earlier maturing age mates. However, In the matched pairs analysis, no such negative relation was found. Inspection of data revealed that about 70% of the matchable pairs were Summer born subjects, who showed throughout positive correlations also in the parametric data elaboration. This seems to account for the fact that in the matched pairs analysis only positive or close to zero relations appear. It is noteworthy that the mental growth spurt seems to be manifest earlier in the scores of the Raven, MILTA Vocabulary and Sentence Completion and appears relatively later in the Numerical Analogies.

It may be argued that the "cessation of the mental growth spurt" may be caused by the ceiling of the mental tests, especially in view of the high intelligence of this population. This however seems to be not the case for the following reasons: 1) the Raven and MILTA tests have ceilings which are above the mental level of this sample. 2) Ceiling effects would cause zero correlations but not significantly negative ones. 3) The mentally precocious Summer subjects, who would be closest to the ceiling, nevertheless continue to show positive correlations.

In the Medium Level girls the precocity of the earlier maturing partner is most pronounced during the P/P constellation. Again, as age advances during the follow-up from examination I to examination IV, the relationship tends to vane, except for the Numerical Analogies, which--in a similar way as in the High Level sample--show a "delayed growth spurt." Also on the Guttman Analytical Test, the earlier maturer is conspicuously superior during the A/A and P/A constellations, while this superiority tends to increase between examination I to examination III.

On the other hand, contrary to the pattern found in the High Level sample, there appears a tendency of reversals during the A/A and P/A phases. Although these reversals show up in part in the Structural Error Scores, and could be interpreted as a result of the earlier maturer's ambition to attempt more items (without being able to solve them), there are several reversals also in performance scores, and they are too frequent and too consistent to be considered as a chance fluctuation.

It looks as if a short phase of growth deceleration precedes the mental growth spurt, similar to the "pre-adolescent dip" in physical growth increment which typically precedes the physical growth thrust. (See Figure 12). The earlier maturer, passing this dip earlier, might thus temporarily be surpassed by the late maturer, but once the former has entered the phase of intensive mental growth (whereas the late maturer now passes the dip) the change in the direction of the relationship will be sharp, which indeed seems to be the case. Not all mental functions are affected by this dip and its absence in the High Level sample still remains to be explained.

The results of the matched pairs method do not contradict the sporadically appearing positive correlations in the Medium Level Summer subjects at grades 6 and 7. However the parametric findings are too scarce to lend substantial support to the non-parametric analysis and clearly demonstrate the shortcoming of the traditional treatment of such data.

In the Low Level female sample the mental growth spurt appears later, as contrary to the findings in the two other samples, it is most pronounced in examinations III and IV, i.e. towards the end of the follow-up period where the subjects have attained the higher chronological age levels. This seems to be plausible in the light of the later physiological maturation of the Lower Level girls, documented before (Table 8 on page 36.

Prepubertal reversals again occur in the Raven, MILTA Vocabulary and also in Numerical Analogies in examination II. The testological incidence of the reversals is somewhat consistent with those which appear in the Medium Level sample. Also consistent is the late appearance of the earlier maturer's superiority in Numerical Analogies during constellation P/P. In light of the inconclusive results of the parametric elaboration, greater confidence might be placed in these findings, demonstrating a substantial relationship between mental and physiological growth in culturally disadvantaged girls at adolescence.

Text continues on page 76.

LEGEND TO TABLES 22-37

CR	correct response score
DE	directional error score
SE	structural error score
SA	correctly solved simple analogies
TA	correctly solved triple analogies

Upper number in number pairs is incidence of earlier maturing partner having higher scores on performance scores and directional errors or having lower scores on structural errors.

A/A	earlier and later maturing subjects are prepubertal
P/A	earlier maturing subject is pubertal, later maturing subject is prepubertal
P/P	earlier and later maturing subjects are pubertal
P/A+P	earlier maturing subject is pubertal, later maturing subject is either prepubertal or pubertal
Total E/L	comparison of earlier vs later maturing subjects irrespective of maturational status constellation
E=L	incidence of earlier and later maturing subjects having equal scores
TP =	total performance pattern on all compared performances listed in same row. Upper number is incidence of comparisons on which earlier maturing partner is mentally superior. Number in parentheses indicates incidence of comparisons showing both partners performing equally.

* Binominal distribution significant at .06 level at least

+ Binominal distribution significant at .1 level at least

TABLE 22

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, High Level, Examin. I

Mental Tests	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO. OF PAIRS PER GRADES				
Matur. Stages	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	8 4	7 6	6 5	5 6	6 8	7 6	6 6	7 5	7 3	7 3	5 5	4 6	5 6	5 4	2 5	0 3	4 6	9+ 3	8 4	5 6	11 7 (2)	6	6	3	-	-
P/A	3 8	4 5	6 4	6 3	7 3	5 3	5 2	5 2	6 3	6 3	6 2	4 4	4 1	5 5	6 3	2 1	4 4	4 5	4 5	4 6	12 5 (3)	2	3	6	2	-
P/P	4 4	6 2	1 5	4 0	1 4	3 4	2 4	2 3	2 3	2 3	5 4	3 3	2 0	5 3	4 3	8* 1	3 5	4 3	5 4	3 5	9 9 (2)	-	-	-	8	-
P/A+P	6 8	10 7	7 9	10* 3	8 7	8 7	7 6	7 5	8 6	8 6	11 6	7 7	6* 1	10 8	10 6	10* 2	7 9	8 8	9 9	7 11						
E/L	15 16	17 13	13 14	15 9	14 15	15 13	13 12	14 10	15 9	15 9	16 11	11 13	11 7	15 2	12 11	10 5	11 15	17 11	17 13	12 17						
E=L	1	2	4	7	2	2	5	4	5	5	2	5	11	2	5	1	2	2	0	2						
NO. OF PAIRS	32	32	31	31	31	30	30	28	29	29	29	29	29	29	28	16	28	30	30	31						

TABLE 23

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, High Level, Examin. II

Mental Tests Matur. Stages	Num.	An.	Verbal Anal 1			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8#	9
A/A	3	4	-	-	-	2	2	3	-	-	1	1	2	3	3	0	3	-	-	0	6	4	2	-	-	-
	1	2	-	-	-	2	2	1	-	-	2	2	1	1	1	0	1	-	-	0	2					
P/A	6	4	-	-	-	7	7	7	-	-	5	5	3	10*	11*	1	6	-	-	0	8(2)	4	5	4	1	-
	5	5	-	-	-	3	3	4	-	-	5	4	3	3	2	3	4	-	-	0	2					
P/P	6	4	-	-	-	6	6	6*	-	-	3	3	1	8	7	7	7	-	-	5	9(2)	-	1	7	7	-
	2	2	-	-	-	2	2	1	-	-	3	3	2	7	3	5	7	-	-	3	1					
P/A+P	12	8	-	-	-	13*	13*	13*	-	-	8	8	4	18	18**	8	13	-	-	5						
	7	7	-	-	-	5	5	5	-	-	8	9	5	10	5	8	11	-	-	3						
E/L	15	12	-	-	-	15+	15+	16**	-	-	9	9	6	21	21**	8	16	-	-	5						
	8	9	-	-	-	7	7	6	-	-	10	11	6	11	6	5	12	-	-	3						
E=L	1	3	-	-	-	2	2	2	-	-	5	4	12	0	5	2	4	-	-	0						
NO. OF PAIRS	24	24	-	-	-	24	24	24	-	-	24	24	24	32	32	18	32	-	-	8						

#Eight grades examined with MILTA tests only.

TABLE 24

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS
MATCHED FOR CHRONOLOGICAL AGE

Girls, High Level, Examin. III

Mental Tests / Matur. Stages	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	2 1	3 0	2 1	2° 0	2 1	3 0	3 0	3 0	2 0	2 0	1 0	0 2	0 2	3° 0	3 0	0 1	3° 0	2 1	1 2	2 0	16 4(0)	-	3	1	1	-
P/A	5 3	4 5	4 4	6* 1	4 4	2 4	2 3	2 4	2 3	2 3	4 2	3 3	4 3	6 2	4 4	1 1	6 2	6* 1	5 2	4 2	9 7(4)	-	4	4	2	-
P/P	10+ 4	7 5	7 3	4 6	6 2	8 3	7 3	8 3	5 1	5 1	4 4	4 4	3 1	7 7	9 4	6 6	8 5	6 4	9* 1	2 4	14 2(4)	-	-	3	10	4
P/A+P	15+ 7	11 10	11 7	10 7	10 6	10 7	9 6	10 7	7 4	7 4	8 6	7 7	7 4	13 9	13 8	7 7	14+ 7	12 5	14* 3	6 6						
TOTAL E/L	17+ 8	14 10	13 8	12 7	12 7	13 7	12 6	13 7	9 4	9 4	9 6	7 9	7 6	16 9	16+ 8	7 8	17* 7	14* 6	16* 4	8 6						
E=L	0	1	3	5	5	4	6	4	4	4	2	1	4	0	1	0	1	1	1	1						
NO. OF PAIRS	25	25	24	24	24	24	24	24	17	17	17	17	17	25	25	15	25	21	21	15						

°A+P/A significant at 04 level.

TABLE 25

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, High Level, Examin. IV

Mental Tests / Matur. Stages	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9#
A/A	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	-	-	-	7 (9)	-	2	-	-	-
	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	-	-	-	1					
P/A	4	3	5	2	5	2	2	2	3	3	5	3	3	5	5	1	3	-	-	-	10 (5)	-	6	4	1	-
	4	3	2	3	2	1	1	1	3	3	2	2	1	3	3	1	6	-	-	-	2					
P/P	5	3	5	2	5	4	4	5	2	2	3	3	2	7	5	7	6	-	-	-	9 (3)	-	-	4	10	2
	7	7	4	2	3	4	3	2	5	4	4	3	4	6	5	3	5	-	-	-	5					
P/A+P	9	6	10	4	10	6	6	7	5	5	8	6	5	12	10	8	9	-	-	-						
	11	10	6	5	5	5	4	3	8	7	6	5	5	9	8	4	11	-	-	-						
TOTAL	10	7	10	4	10	6	6	7	5	5	9	6	6	13	11	8	10	-	-	-						
E/L	11	10	6	5	5	5	4	3	8	7	6	6	5	9	8	4	11	-	-	-						
E=L	-	4	1	8	2	4	5	5	4	4	1	3	5	1	4	2	2	-	-	-						
NO. OF PAIRS	21	21	17	17	17	15	15	15	17	16	16	16	16	23	23	14	23	-	-	-					1	

#NINTH GRADERS EXAMINED WITH MILTA TESTS ONLY.

TABLE 26

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Pilot Sample, High Level, 6th and 7th Graders in November 1966

Exam. Tests	I November 1966	II June 1964	III November 1967	IV June 1968	V June 1969
MILTA ANAL	15 9 (1)	15* 6 (1)	9 9 (1)	7 5 (0)	4 1 (1)
MILTA CONC	15* 6 (4)	11 10 (2)	12 9 (0)	9 4 (2)	3 3 (0)
RAVEN	20* 8 (0)	13+ 6 (0)	-- --	-- --	5 1 (0)
MAT. STATUS					
AA	12	8	4	0	0
PA	8	10	11	9	0
PP	7	10	10	10	9

TABLE 27

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Pilot Sample, High Level, 8th Graders in November 1966

	Exam.	
Tests	I November 1966	II June 1967
MILTA ANAL	5 9 (2)	10 6 (0)
MILTA CONC	7 8 (3)	6 7 (2)
RAVEN	7 9 (1)	5 10 (1)
MAT. STATUS		
AA	1	0
PA	6	2
PP	11	16

TABLE 28

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Pilot Sample, Medium Level, 6th and 7th Graders in November 1966

Exam. Tests	I November 1966	II June 1967	III November 1967	IV June 1968	V June 1969
MILTA ANAL	6 8(1)	3 7(1)	5 8(2)	5 2(0)	0 4(0)
MILTA CONC	4 7(4)	5 5(1)	3 8(2)	3 3(1)	0 3(1)
RAVEN	8 3(1)	7 6(0)	-- --	-- --	0 2(0)
MAT. STATUS					
AA	4	2	1	0	0
PA	8	3	7	7	2
PP	4	6	7	8	2

TABLE 29

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Pilot Sample, Medium Level, 8th Graders in November 1966

Exam.	I	II
Tests	November 1966	June 1967
MILTA ANAL	$^{3}_{2}(0)$	$^{3}_{2}(0)$
MILTA CONC	$^{4}_{0}(1)$	$^{4}_{1}(0)$
RAVEN	$^{4}_{1}(0)$	$^{4}_{1}(0)$
MAT. STATUS		
AA	0	0
PA	2	2
PP	5	5

TABLE 30

DIFFERENCES IN SIZE AND DIRECTION OF CORRELATIONS** BETWEEN PHYSIOLOGICAL MATURATION (AGE AT MENARCHE) AND MENTAL GROWTH IN AGE-MATCHED PAIRS OF POST-MENARCHEAL GIRLS IN LOWER VS HIGHER AGE/GRADE GROUPS

PILOT SAMPLE, HIGH SOCIOECONOMIC LEVEL

Grade	Raven	MILTA Concepts	MILTA Analog
6 and 7	-.65* N = 14	-.17 N = 15	-.44+ N = 11
8	+.16 N = 26	+.16 N = 26	+.12 N = 24

* P = .05
+ P = <.1
>.05

**Spearman rho.

TABLE 31

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Medium Level, Examin. I

Mental Tests Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO.OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	3 8	8 4	9 8	7 7	10 8	10 10	7 11	11 7	8 7	9 6	5 10	8 9	5* 15	11 7	9 4	0 0	7 7	11 10	7+ 14	18 7	10 6(4)	18	6	0	0	
P/A	7 10	6 6	9 6	10 9	8 9	6 11	9 10	8 12	6 11	5 12	11 6	9 5	12 6	6 11	7 12	3 6	1* 15	6+ 13	8 11	6 10	5 14(1)	2	10	6	4	
P/P	5 3	9+ 3	7 4	5 3	7 4	8 3	8 5	8** 2	9 5	9 5	6 6	9 6	10 5	12* 3	11* 3	9* 2	10* 3	8 7	9 6	8 4	19 0(1)	0	2	6	9	
P/A+P	12 13	15 9	16 10	15 12	15 13	14 14	17 16	16 14	15 16	14 17	17 12	18 11	22 11	18 14	18 15	11 8	11 18	14 20	17 17	14 14	12 5(3)					
TOTAL E/L	15 22	23+ 12	25 18	22 19	25 21	24 24	24 26	27 21	23 23	23 23	22 22	26 20	27 26	30 25	27 19	11 8	28 25	25 30	24 31	22 21	12 4(4)					
E=L	-	2	4	6	1	6	4	6	10	10	12	10	4	2	4	1	4	2	2	3						
NO. OF PAIRS	36	36	47	47	47	54	54	54	56	56	56	56	57	57	50	20	57	57	57	56						

TABLE 32

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Medium Level, Examin. II

Matur. Stages / Mental Tests	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	9	9	-	-	-	9	5	6	-	-	3+	6	3	12	9	0	11	-	-	-	6 (1)	18	5	0	0	
	7	5	-	-	-	6	9	8	-	-	9	3	8	8	11	0	10	-	-	-	5					
P/A	7	9	-	-	-	10	8	10	-	-	6	8	8	6	8	1	3*	-	-	-	6 (3)	2	10	4	2	
	7	4	-	-	-	5	5	5	-	-	7	4	6	9	8	1	11	-	-	-	3					
P/P	10	10	-	-	-	11	9	11	-	-	10	10	4	9	11*	7	7	-	-	-	10 (1)	0	3	8	11	
	8	9	-	-	-	6	4	5	-	-	7	8	8	6	4	6	7	-	-	-	1					
P/A+P	17	19	-	-	-	21	17	21*	-	-	16	18	12	15	19	8	10	-	-	-	9 (1)					
	15	13	-	-	-	11	9	10	-	-	14	12	14	15	12	7	18	-	-	-	2					
TOTAL E/L	26	28	-	-	-	30	22	27	-	-	19	24	15	27	28	8	21	-	-	-	9 (0)					
	22	18	-	-	-	17	18	18	-	-	23	15	22	23	23	7	28	-	-	-	3					
E=L	3	5	-	-	-	3	10	5	-	-	8	11	13	4	3	-	1	-	-	-						
NO. OF PAIRS	51	51	-	-	-	50	50	50	-	-	50	50	50	54	54	15	49	-	-	-						

TABLE 33

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Medium Level, Examin. III

Mental Tests Matur. Stages	Num. CR	An. SE	Verbal Anal I CR	Verbal Anal I DE	Verbal Anal I SE	Verbal Anal II SA	Verbal Anal II TA	Verbal Anal II SE	QDR I CR	QDR I SE	QDR II CR	QDR II DE	QDR II SE	MILTA VOC	MILTA SC	MILTA AN	MILTA CON	RAVEN CR	RAVEN SE	GST	TP	NO. OF PAIRS PER GRADES 5	6	7	8	9
A/A	5 9	6 7	10 5	5 10	7 8	4^{o} 10	5 9	5 9	8 7	7 7	5 6	7 4	5 6	5 6	5 6	0 0	6 4	6 9	5 9	10* 3	5 13 (2)		17	3	0	
P/A	5 5	6 7	6 6	6 4	7 5	3 7	4 6	3 7	7 8	7 8	3 6	6 6	5 5	4 10	8 6	0 3	6 8	4 7	4 6	6 5	4 12 (4)		3	10	4	
P/P	6 3	4 3	4 5	3 5	6 2	5 5	4 4	6 4	6 3	6 3	3 2	1 4	3 6	6 4	6 2	1 1	4 4	6 4	8* 2	6* 1	12 4 (4)		0	4	8	
P/A+P	11 8	10 10	10 11	9 9	13 7	8 12	8 10	9 11	13 11	13 11	6 8	7 10	8 11	10 14	14 8	1 4	10 12	10 11	12 8	12 6						
TOTAL E/L	16 17	16 17	20 16	14 19	20 15	12 22	13 19	14 20	21 18	20 18	11 14	14 14	13 17	15 19	19 14	1 4	16 16	16 20	17 17	22* 9						
E=L	4	4	1	4	2	3	5	3	2	3	13	10	8	2	3	3	1	-	2	1						
NO. OF PAIRS	37	37	37	37	37	37	37	37	41	41	38	38	38	36	36	8	33	36	36	32						

TABLE 34

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Medium Level, Examin. IV

Mental Tests / Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	10	9	5	6	6	5	5	5	3	3	4	3	4	7	5	0	4	-	-	-	8 (6)	15	3	0	0	
	6	7	4	4	6	6	4	6	3	3	3	3	2	7	10	0	6	-	-	-	3					
P/A	7	3	10	5	7	4	4	4	6	6	2	5	4	6	10	1	7	-	-	-	9	5	8	3	0	
	5	4	6	7	5	7	7	7	2	2	4	3	3	9	6	4	6	-	-	-	8					
P/P	7*	6	6	4	4	4	5	4	3	3	4	5	3	5	4	4	4	-	-	-	8 (3)	0	6	9	0	
	0	3	5	5	5	4	4	5	4	4	4	3	1	4	5	4	2	-	-	-	6					
P/A+P	14*	9	16	9	11	8	9	8	9	9	6	10	7	11	14	5	11	-	-	-						
	5	7	11	12	10	11	11	12	6	6	8	6	4	13	11	8	8	-	-	-						
TOTAL E/L	24*	18	21	15	17	13	14	13	12	12	10	13	11	18	19	5	15	-	-	-						
	11	14	15	16	16	17	15	18	9	9	11	9	6	20	21	8	14	-	-	-						
E=L	1	4	1	6	4	7	8	5	5	5	5	4	9	3	1	-	6	-	-	-						
NO. OF PAIRS	36	36	37	37	37	37	37	36	26	26	26	26	26	41	41	13	35	-	-	-						

TABLE 35

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Low Level, Examin. I

Mental Tests / Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	2 5	4 3	2 4	2 1	2 4	2 3	2 3	2 3	4 3	4 4	2 4	4 2	3 4	6 5	3 6	0 0	5 4	2* 8	2* 8	1* 6	6 12 (2)	7	4	-	-	-
P/A	3 2	2 3	3 1	3 0	1 3	2 2	2 1	3 1	4 1	4 1	3 1	3 2	3 0	4 1	2 2	2 1	2 4	3 2	4 1	2 3	14 4 (2)	-	2	3	-	-
P/P	4 2	3 3	1 3	3 1	4 1	3 2	3 2	4 1	4 2	4 1	4 2	2 3	2 3	1 2	1 2	2 1	1 1	2 5	5 2	3 3	10 7 (3)	-	-	2	5	-
P/A+P	7 4	5 6	4 4	6* 1	5 4	5 4	5 3	7+ 2	8 3	8* 2	7 3	5 5	5 3	5 3	3 4	4 2	3 5	5 7	9 3	5 6						
E/L	9 9	9 9	6 8	8* 2	7 8	7 7	7 6	9 5	12 6	12 6	9 7	9 7	8 7	11 8	6 10	4 2	8 9	7+ 15	11 11	6 12						
E=L	-	-	1	5	-	1	2	1	3	3	5	5	6	1	4	-	3	-	-	1						
NO. OF PAIRS	18	18	15	15	15	15	15	15	21	21	21	21	21	20	20	6	20	22	22	18						

TABLE 36

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Low Level, Examin. II

Mental Tests Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	2* 8	4 5	-	-	-	4 6	3 3	4 6	-	-	4 5	2 3	5 4	4 4	5 2	0 0	2 5	-	-	-	2 7(3)	7	3	-	-	-
P/A	4 1	3 2	-	-	-	3 2	2 1	4 1	-	-	3 1	1 2	2 2	2 1	2 1	2 1	2 1	-	-	-	10 1(1)	-	3	3	-	-
P/P	4 4	4 3	-	-	-	4 3	3 3	5 3	-	-	4 3	2 4	1 5	1* 6	4 2	3 4	3 3	-	-	-	5 4(3)	-	-	3	4	-
P/A+P	8 5	7 5	-	-	-	7 5	5 4	9 4	-	-	7 4	5 4	3 7	3 7	6 3	5 5	5 4	-	-	-						
TOTAL E/L	10 13	11 10	-	-	-	11 11	7 8	13 10	-	-	11 9	7 7	8 11	7 11	10 5	5 5	7 9	-	-	-						
E=L	-	1	-	-	-	1	8	-	-	-	2	8	3	-	2	-	2	-	-	-						
NO. OF PAIRS	23	22	-	-	-	23	23	23	-	-	22	22	22	18	18	10	18	-	-	-						

TABLE 37

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Low Level, Examin. III

Mental Tests / Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	2 3	0* 6	2 3	1 4	2 4	2 4	1 4	2 4	4 3	4 3	3 2	3 2	3 3	3 3	1 5	0 0	0 4	2 4	3 3	1 5	5 (2) 13	-	4	2	-	-
P/A	5 1	4 2	4 1	3 2	4 2	4 1	4 1	4 1	5 0	4 0	4 0	3 2	3 2	2 2	3 1	2 0	3 1	3 3	1 5	4 1	17 (2) 1	-	-	2	3	-
P/P	1 2	1 1	4 1	1 3	4 0	3 2	2 1	3 2	3 0	4 0	4 1	3 2	1 2	0 0	0 0	0 0	0 0	2 0	2 0	1 0	13 (5) 2	-	-	-	3	4
P/A+P	6 3	5 3	8* 2	4 5	8* 2	7 3	6 2	7 3	8** 0	8** 0	8* 1	6 4	4 4	2 2	3 1	2 0	3 1	5 3	3 5	5 1						
TOTAL E/L	8 6	5 9	10 5	5 9	10 6	9 7	7 6	9 7	12* 3	12* 3	11* 3	9 6	7 7	5 5	4 6	2 0	3 5	7 7	6 8	6 6						
E=L	1	1	2	3	1	-	3	-	4	4	4	3	4	2	2	1	-	-	-	1						
NO. OF PAIRS	15	15	17	17	17	16	16	16	19	19	18	18	18	12	12	3	8	14	14	13						

TABLE 38

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Girls, Low Level, Examin. IV

Mental Tests Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	1 2	1 2	1 2	1 1	1 2	3 0	3 0	2 1	0 1	0 1	0 1	1 0	0 1	1 0	2 0	0 0	1 1	- -	- -	- -	7 9(1)	-	2	1	-	-
P/A	2 0	2 0	2 0	1 1	2 0	0 2	0 1	0 2	2 0	2 0	0 0	2 1	2 0	2 0	1 1	0 0	2 0	- -	- -	- -	11 3(3)	-	-	1	2	-
P/P	5 1	4 2	5 3	2 5	6 1	4 3	5 2	6 2	7** 0	7** 0	3 2	5 3	3 4	5 3	3 4	3 2	6 2	- -	- -	- -	14 3	-	-	1	4	4
P/A+P	7* 1	6 2	7 3	3 6	8* 1	4 5	5 3	5 4	9** 0	9** 0	3 2	7 4	5 4	7 3	4 5	3 2	8* 2	- -	- -	- -						
TOTAL E/L	8 3	7 4	8 5	4 7	9+ 3	7 5	8 3	7 5	9* 1	9* 1	3 3	8 4	5 5	8 3	6 5	3 2	9+ 3	- -	- -	- -						
E=L	1	1	-	2	1	1	2	1	1	1	6	-	2	3	3	-	2	-	-	-						
NO. OF PAIRS	12	12	13	13	13	13	13	13	11	11	12	12	12	14	14	5	14	-	-	-						

In the sample of the High Level boys (Tables 39-42) a conspicuous mental superiority of early maturers appears in constellation P/P, which in light of the wider range of the operationally defined "P" phase in boys (including pubic hair stage three) must be interpreted as a rather close relationship between the physical and mental pre-adolescent growth spurt. The relationship becomes weaker with the progress of the follow-up until in examination IV it disappears--except for the MILTA Concepts. This again seems to be due to the progressively decreasing number of subjects being in their growth spurt period. On the other hand, sporadic reversals occur. They are predominantly located in the A/A or P/A constellation with the exception of the Questionnaire of Deductive Reasoning II, reverting also during the P/P phase. While we are unable to explain this latter deviant pattern, the other prepubertal reversals or reversal tendencies could be again the result of a deceleration phase preceding the mental growth spurt.

These reversals could be the non-parametric expression of the "interlude of negative correlations" between the fifth and eighth grades, which showed up in the parametric elaboration (above, page 39).

Of course, the reversals occurring in Structural and Directional Error Scores are not necessarily considered as signs of inferior performances on the part of the earlier maturers, so that in general the prepubertal reversal tendency in this sample is not pronounced.

In the Medium Level male sample (Tables 43-46) the mental growth pattern is quite different from that encountered in the other groups, in that the "critical phase" of the earlier maturer's precocity appears as shifted downwards to the pre-pubertal constellation A/A. With the shrinkage of prepubertal subjects towards the end of the follow-up the whole pattern disappears, but on the other hand, contrary to the other samples, no close-to-pubertal mental growth spurt occurs. On the contrary, reversal tendencies show up in the P/A and P/P categories, Numerical Analogies in examination IV remaining the only incidence of pubertal mental precocity in earlier maturing subjects.

It seems thus, that in this population, puberty tends to slow down the strictly prepubertal growth spurt, a phenomenon known to occur in the physical growth (see Figure 12). The later maturing subjects still continuing to be in the phase of intensified mental maturation might thus surpass the already pubertally slowing down early maturers.

This would explain the emergence of negative correlations in the higher grades of this sample (while the positive ones in the fifth grade are parallel to the findings in the A/A phase, obtained by non-parametric analysis.)

Possibly another mental growth spurt occurs in later puberty, after the developmental period investigated by this study.

Some evidence in this direction are the positive correlations reappearing at the end of the eighth grade of Winter subjects (Table 12, page 45).

Although in the rather small sample of Low Level boys significant relationships can hardly be expected, there seems to be an overall, albeit weak tendency of earlier maturers to be mentally precocious. This is not so much evident from the sporadic nearly significant binominal distributions in Numerical and Verbal Analogies, as from the Total Performance Pattern. As these results contradict the correlational patterns indicating negative relationships between mental and physical growth in this sample, no definitive conclusions should be drawn until cross validation will be carried out on a larger sample of culturally disadvantaged boys. (Tables 47-50).

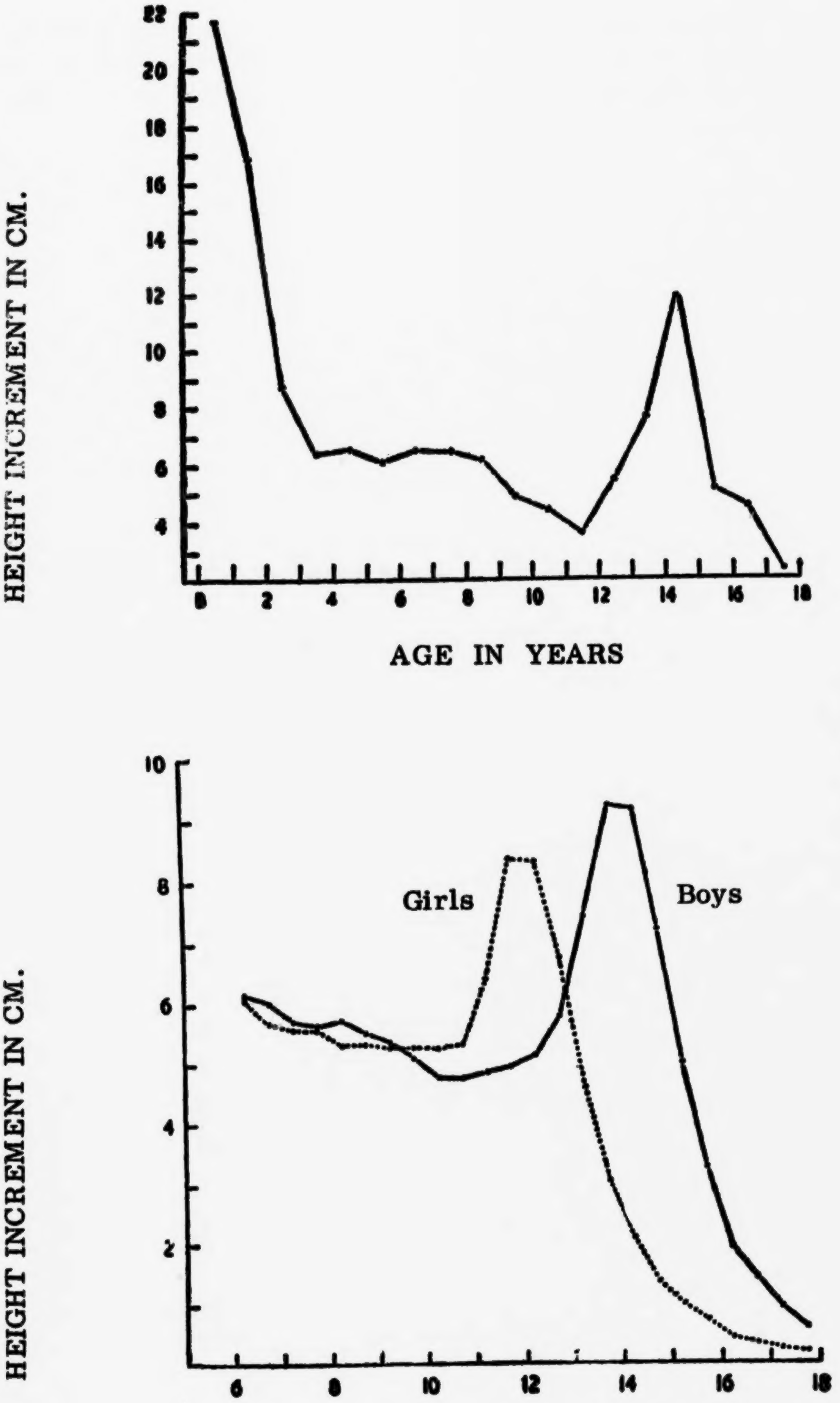

Figure 12

Longitudinal Patterns of Height Increments Showing the Deceleration Dip Preceding the Pre-Adolescent Growth Spurt

TABLE 39

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, High Level, Examin. I

Mental Tests	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO.OF PAIRS PER GRADES				
Matur. Stages	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	8	12	12	10	16*	13	14	14	13	13	11+	7+	6*	7	12	2	12	13	12	5*	12 (0)	16	7	4		
	13	10	9	11	7	12	11	10	10	10	5	14	13	10	14	3	15	9	10	13	8					
P/A	8	4	6	5	5	4	4	4	6	4	2*	5	1*	6	6	3	3	3	3	6	4 (5)		6	5	2	
	4	4	5	5	5	6	6	6	6	6	7	3	6	7	6	5	7	8	6	5	11					
P/P	7	8*	9+	4	8	9*	9*	7*	5	6	2*	9+	3	11*	10**	6	9	9	10*	9*	16 (2)		1	3	12	
	3	2	3	8	5	1	1	2	4	4	10	3	3	2	1	6	4	5	3	1	2					
P/A+P	15+	12	15	9	13	13	13	11	11	10	4	14*	4	17	16*	9	12	12	13	15*						
	7	6	8	13	10	7	7	8	10	10	17	6	9	9	7	11	11	13	9	6						
TOTAL	23	24	27	19	29	26	27	25	24	23	15	21	10	24	28	11	24	25	25	20						
E/L	20	16	17	24	17	19	18	18	20	20	22	20	22	19	21	14	26	22	19	19						
E=L	4	5	5	6	3	4	4	4	9	8	5	1	10	2	5	3	4	1	4	3						
NO. OF PAIRS	45	45	49	49	49	49	49	48	51	51	42	42	42	45	44	28	44	48	48	42						

TABLE 40

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, High Level, Examin. II

Matur. Stages / Mental Tests	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO.OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8#	9
A/A	8	10	-	-	-	10	9	9	-	-	9	8	8	10	9	0	10	-	-	0	7 (2)	15	4	1		
	11	6				6	5	6			7	6	8	7	8	1	5			0	2					
P/A	6	2*	-	-	-	5	5	4	-	-	4	4	3	4	5	3	7	-	-	2	4 (0)	1	9	4	2	
	4	7				7	6				7	6	7	9	8	2	6			1	9					
P/P	2	3	-	-	-	2	1	2	-	-	2	1	1	8	8*	10*	6	-	-	2	9 (3)		2	6	12	
	1	1				1	3	1			1	1	1	4	2	2	4			2	1					
P/A+P	8	5	-	-	-	7	6	6	-	-	6	5	4	12	13	13*	13	-	-	4						
	5	8				8	9	8			8	7	8	13	10	4	10			3						
TOTAL E/L	16	15	-	-	-	17	15	15	-	-	15	13	12	22	22	13	23	-	-	4						
	16	14				14	14	14			15	13	16	20	18	5	15			3						
E=L	2	5	-	-	-	2	3	3	-	-	2	6	5	3	8	0	8	-	-	2						
NO. OF PAIRS	34	34	-	-	-	33	32	32	-	-	32	32	33	45	48	18	46			9						

#Eighthgraders tested with MILTA only.

TABLE 41

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, High Level, Examin. III

Mental Tests Matur. Stages	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO.OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	5 3	5 3	4 2	3 2	3 2	- -	- -	- -	2 3	2 3	2 5	5 2	0 3	4 5	5 4	0 1	5 2	5 1	3 2	- -	10 6 (0)		10	1	1	
P/A	3 9	4 7	5 9	5 9	4 7	- -	- -	- -	3 6	3 6	5 4	4 3	2 6	4 8	6 6	1 2	4 6	3 8	4 7	- -	2 13 (1)		6	10	2	
P/P	8* 2	6 4	6 6	8* 2	7 6	- -	- -	- -	4 5	4 5	4 5	3 3	3 3	7 6	4 6	5 6	10* 2	5 4	1* 6	- -	7 6 (3)			4	8	5
P/A+P	11 11	10 11	11 15	13 11	11 13	- -	- -	- -	7 11	7 11	9 9	7 6	5 9	11 14	10 12	6 8	14 8	8 12	5* 13	- -						
TOTAL E/L	16 14	15 14	15 17	16 13	14 15	- -	- -	- -	9 14	9 14	11 14	12 8	5 12	15 19	15 16	6 9	19 10	13 13	8 15	- -						
E=L	3	4	0	3	3	-	-	-	3	3	1	8	9	1	4	1	6	2	4	-						
NO. OF PAIRS	33	32	32	32	32	-	-	-	26	26	26	26	26	35	35	16	35	28	27	-						

TABLE 42

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, High Level, Examin. IV

Mental Tests / Matur. Stages	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO.OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9#
A/A	0	0	2	0	2	1	1	0	0	0	0	2	0	2	1	0	1	-	-	-	7 (4)		4	1		
	3	2	0	0	1	-	-	1	1	1	2	0	0	-	-	0	1	-	-	-	6					
P/A	5	7	8	5	9	7	7	5	4	4	7	3	3	6	3	0	4	-	-	-	4 (3)		11	6	3	
	8	5	8	5	8	8	7	9	7	7	4	7	1	7	8	3	8	-	-	-	10					
P/P	3	2	6	5	4	9	7	8	4	4	7	5	3	10	8	8	11*	-	-	-	8 (2)			8	7	4
	5	5	6	6	6	5	5	5	9	9	5	6	3	7	7	5	4	-	-	-	7					
P/A+P	8	9	14	10	13	16	14	13	8	8	14	10	6	16	11	8	15									
	13	10	14	11	14	13	12	14	16	16	9	13	4	14	15	8	12									
TOTAL E/L	8	9	16	10	15	17	15	13	8	8	14	10	6	18	12	8	16									
	16	12	14	11	15	13	12	15	17	17	11	13	4	14	15	8	13									
E=L	6	9	4	13	4	3	6	-	5	5	4	6	19	1	7	-	5									
NO. OF PAIRS	30	30	34	34	34	33	33	27	30	30	29	29	29	33	34	15	34									

#Ninth graders tested with MILTA tests only.

TABLE 43

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Medium Level, Examin. I

Mental Tests	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO.OF PAIRS PER GRADES				
Matur. Stages	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	16	17*	18+	14	22**	16*	13*	16*	13	13	9	8	11	15	13	2	10	19*	17	19**	16 (0)	16	10	3	-	
	9	5	9	13	4	6	5	6	9	10	12	10	8	8	8	1	12	7	8	5	4					
P/A	6	5	3	4	5	3	3	3	2	2	2	5	2	4	4	2	3	6	8	8	11 (1)	-	4	6	2	
	4	2	2	1	2	4	4	3	5	4	4	1	4	3	3	3	5	5	3	3	8					
P/P	4	2	2	1	1	3	2	3	1	1	3	2	2	3	5	3	3	3	2	4	10 (3)	-	-	5	2	
	2	4	1	3	4	2	3	2	3	3	0	1	2	1	1	3	3	2	3	2	7					
P/A+P	10	7	6	5	6	6	5	6	3	3	5	7+	4	7	9	5	6	9	10	12+						
	6	6	3	4	6	6	7	5	8	7	4	2	6	4	4	6	8	7	6	5						
TOTAL	26	24*	24*	18	28*	22	18	22	16	16	14	15	15	22	22	7	16	28*	27*	31**						
E/L	15	11	12	17	10	12	12	11	17	17	16	12	14	12	12	7	20	14	14	10						
E=L	-	6	4	4	1	1	5	2	5	5	5	8	6	2	3	-	2	-	-	1						
NO. OF PAIRS	41	41	39	39	39	35	35	35	38	38	35	35	35	36	36	20	44	42	41	42						

TABLE 44

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Medium Level, Examin. II

Mental Tests Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	11	10	-	-	-	12	11	11	-	-	15**	7	12*	10	13+	1	10	-	-	-	10(2)	13	7	2	-	
	7	8				7	6	6			4	7	4	10	6	1	9				0					
P/A	7	5	-	-	-	5	5	5	-	-	6	1*	4	5	3	2	5	-	-	-	6(4)	3	6	4	2	
	6	7				5	3	5			4	7	4	4	5	1	3				2					
P/P	5	5	-	-	-	6	5	6	-	-	1	5	3	5	3	4	4	-	-	-	9(2)	-	1	8	2	
	1	2				2	2	2			3	2	3	1	3	2	1				1					
P/A+P	12	10	-	-	-	11	10	11	-	-	7	6	7	10	6	6	9	-	-	-						
	7	9				7	5	7			7	9	7	5	8	3	4									
TOTAL	23	20	-	-	-	22	20	22	-	-	22	13	19	20	19	7	19	-	-	-						
E/L	14	17				14	11	13			11	16	11	15	14	4	13									
E=O	5	5	-	-	-	4	9	6	-	-	6	10	8	1	3	3	4	-	-	-						
NO. OF PAIRS	42	42	-	-	-	41	41	41	-	-	39	39	39	36	36	14	36	-	-	-						

TABLE 45

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Medium Level, Examin. III

Matur. Stages / Mental Tests	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO.OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	6	7+	6	4	2	8*	6	6	5	5	7	4	4	5	5	2	6	8*	7+	3	15 (1)	-	8	6	-	
	5	2	2	6	6	1	3	4	5	5	3	4	1	3	5	0	2	2	2	5	4					
P/A	4	4	6	10+	5	7	5	7	7	7	8	2*	4	4	5	1	3*	8	6	7	5 (1)	-	8	6	3	
	9	6	9	4	7	8	8	8	6	6	5	8	7	9	7	2	10	8	11	6	14					
P/P	5	3	5	4	3	6	5	6	3	2	4	5	4	2	4	2	3	5	5	4	11 (4)	-	-	2	8	
	1	2	3	3	5	3	4	3	4	4	5	5	3	3	2	2	3	4	4	4	5					
P/A+P	9	7	11	14	8	13	10	13	10	9	12	7	8	6	9	3	6	13	11	11						
	10	8	12	7	12	11	12	11	10	10	10	13	10	12	9	4	13	12	15	10						
TOTAL	14	14	17	18	10	21	16	19	15	14	19	11	12	11	14	5	12	21	18	14						
E/L	15	10	14	13	18	12	15	15	15	15	13	17	11	15	14	4	15	14	17	15						
E=L	-	6	5	5	4	3	5	2	6	7	5	8	13	4	2	-	4	2	2	1						
NO. OF PAIRS	30	30	36	36	36	36	36	36	36	36	37	36	36	30	30	9	31	37	37	30						

TABLE 46

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Medium Level, Examin. IV

Mental Tests / Matur. Stages	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO.OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	1	3	3	0	3	5	5	4	4	4	2	4	2	3	5	0	4	-	-	-	11 (5)	-	8	1	-	
	2	1	3	5	4	2	1	3	1	1	3	1	2	2	1	0	2	-	-	-	1					
P/A	7	7	7	4	5	6	5	6	0*	0*	3	7	0*	5	7	3	5	-	-	-	8 (3)	-	8	8	3	
	3	4	4	8	4	4	5	4	6	6	7	3	6	9	5	3	5	-	-	-	6					
P/P	9	8	5	5	4	4	5	4	3	4	3	1	0**	4	6	6	6	-	-	-	8 (2)	-	-	4	10	
	4	3	5	3	6	6	3	6	3	3	4	5	6	8	7	5	4	-	-	-	7					
P/A+P	16*	15	12	9	9	10	10	10	3	4	6	8	0**	9	13	9	11	-	-	-						
	7	7	9	11	10	10	8	10	9	9	11	8	12	17	12	8	9	-	-	-						
TOTAL E/L	17	18*	15	9	12	15	15	14	7	8	8	12	2**	12	18	9	15	-	-	-						
	9	8	12	16	14	12	9	13	10	10	14	9	14	19	13	8	11	-	-	-						
E=L	3	3	3	5	4	4	7	4	5	4	2	3	8	4	2	2	9	-	-	-						
NO. OF PAIRS	29	29	30	30	30	31	31	31	22	22	23	23	23	35	33	19	35	-	-	-						

TABLE 47

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Low Level, Examin. I

Mental Tests Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	1 2	2 1	0 0	0 0	0 0	0 0	0 0	0 0	1 1	2 1	1 2	1 2	0 3	1 2	2 0	- -	1 0	1 1	3 0	2 1	6 (5) 5	3	-	-	-	
P/A	2 0	3 0	2 1	3 0	2 1	2 1	1 2	1 2	1 3	0 3	2 0	0 3	0 2	1 1	1 1	1 0	2 1	0 1	0 7	1 1	9 (3) 8	-	2	2	-	
P/P	5 3	4 1	6 3	3 6	6 3	5 3	5 2	4 3	5 2	5 2	2 6	4 3	3 4	3 1	2 5	3 0	2 4	4 4	5 3	4 4	13 (2) 5	1	4	3	1	
P/A+P	7 3	7* 1	8 4	6 6	8 4	7 4	6 4	5 5	6 5	5 5	4 6	4 6	3 6	4 2	3 6	4 0	4 5	4 5	5 4	5 5	10 (7) 3					
TOTAL E/L	8 5	9* 2	8 4	6 6	8 4	7 4	6 4	5 5	7 6	7 6	5 8	5 8	3 9	5 4	5 6	4 0	5 5	5 6	8 4	7 6	13 (3) 4					
E=L	1	3	-	-	-	1	2	2	1	1	1	1	2	3	1	-	2	1	-	-						
NO. OF PAIRS	14	14	12	12	12	12	12	12	14	14	14	14	14	12	12	4	12	12	12	13						

TABLE 48

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Low Level, Examin. II

Mental Tests Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	2	2	-	-	-	2	0	2	-	-	0	1	2	2	1	0	1	-	-	-	7(4)	2	-	-	-	-
	0	0	-	-	-	0	0	0	-	-	1	1	0	0	0	0	1	-	-	-	1					
P/A	1	0	-	-	-	0	0	1	-	-	0	1	0	0	0	0	0	-	-	-		1	-	-	-	-
	0	0	-	-	-	1	0	0	-	-	0	0	1	0	0	0	0	-	-	-						
P/P	8	6	-	-	-	8	5	7	-	-	5	5	5	5	7	3	5	-	-	-	8(4)	1	6	5	1	-
	5	6	-	-	-	4	3	6	-	-	3	5	3	5	4	1	5	-	-	-	0					
P/A+P	9	6	-	-	-	8	5	8	-	-	5	6	5	5	7	3	5	-	-	-	9(3)					
	5	6	-	-	-	5	3	6	-	-	3	5	4	5	4	1	5	-	-	-	0					
TOTAL	11+	8	-	-	-	10	5	10	-	-	5	7	7	7	8	3	6	-	-	-	11(1)					
E/L	5	6	-	-	-	5	3	6	-	-	4	6	4	5	4	1	6	-	-	-	0					
E=L	0	2	-	-	-	1	8	0	-	-	7	3	5	1	1	1	1	-	-	-						
NO. OF PAIRS	16	16	-	-	-	16	16	16	-	-	16	16	16	13	13	5	13	-	-	-						

TABLE 49

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Low Level, Examin. III

Mental Tests / Matur. Stages	Num.	An.	Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN		GST	TP	NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE			5	6	7	8	9
A/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
P/A	1 1	1 1	1 0	1 0	1 0	1 0	1 0	1 0	0 1	0 1	0 2	1 0	0 0	0 2	0 2	0 0	1 1	1 0	1 0	2 0		-	2	-	-	
P/P	7 4	4 7	6 7	6 5	6 6	8 3	6 3	6 4	5 5	5 5	8 5	7 5	10* 3	3 7	4 6	3 2	5 3	8 4	7 5	4 6	13 4 (3)	-	2	6	5	
P/A+P	8 5	5 8	7 7	7 5	7 6	9+ 3	7 3	7 4	5 6	5 6	8 7	8 5	10* 3	3 9	4 8	3 2	6 4	9 4	8 5	6 6	16 3 (1)					
TOTAL E/L	8 5	5 8	7 7	7 5	7 6	9+ 3	7 3	7 4	5 6	5 6	8 7	8 5	10* 3	3 9	4 8	3 2	6 4	9 4	8 5	6 6	15 3 (2)					
E=L	0	0	0	2	1	1	3	2	4	4	0	2	2	1	1	0	2	1	1	2						
NO. OF PAIRS	13	13	14	14	14	13	13	13	15	15	15	15	15	13	13	5	12	14	14	14						

TABLE 50

PAIRED COMPARISON OF PHYSIOLOGICALLY EARLIER VS LATER MATURING SUBJECTS MATCHED FOR CHRONOLOGICAL AGE

Boys, Low Level, Examin. IV

Mental Tests / Matur. Stages	Num. An.		Verbal Anal I			Verbal Anal II			QDR I		QDR II			MILTA				RAVEN				NO. OF PAIRS PER GRADES				
	CR	SE	CR	DE	SE	SA	TA	SE	CR	SE	CR	DE	SE	VOC	SC	AN	CON	CR	SE	GST	TP	5	6	7	8	9
A/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
P/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
P/P	7 5	7 5	9 4	7 4	6 6	7 5	6 5	7 6	6 6	6 6	4 6	9+ 3	7 4	6 6	7 4	4 4	4 8	- -	- -	- -	10 2(5)	-	3	6	5	
P/A+P																										
TOTAL E/L																										
E=L	0	0	0	2	1	1	2	0	1	1	3	1	2	1	2	1	1	-	-	-						
NO. OF PAIRS	12	12	13	13	13	13	13	13	13	13	13	13	13	13	13	9	13	-	-	-						

DISCUSSION

The findings seem to support the main hypothesis of the study in that a relationship was found between physiological maturation and intellectual development at pre-adolescence and early puberty, the latter being assessed mainly by tests presumably measuring "Formal Reasoning."

This relationship is less of a general nature than it is phase specific and seems to appear predominantly during the developmental periods preceding and close to puberty proper (the latter being operationally defined as the beginning of intensified gonadic activity manifest in girls by the menarche, and in both sexes by the cessation of the pre-adolescent growth spurt). This period has been defined in our introduction as "early adolescence" (phase II).

Socio-economic level and parental educational background seem to play a central role in the timing of this stage of intensified intellectual maturation.

In boys and girls of higher socio-economic level and parental educational background, this critical phase appears to be early adolescence, as actually predicted, In the Medium Level girls the mental growth spurt seems to be delayed and to take place at the threshold or at the beginning of puberty proper, whereas in the low level female population it tends to occur still later.

In the male sample an opposite tendency shows up, in that the Medium Level boys pass a stage of intensified pre-pubertal mental maturation located at the very beginning of the pre-adolescent physical growth spurt. On the other hand, with the approach of adolescence, the pre-pubertal mental precocity of the early maturing Medium Level boys ceases rather abruptly.

The sample of the Low Level boys was too small to recognize any definitive patterns of a phase specific relationship between physical and mental growth. However the longitudinal data show a steep progress in achievements on tests of Formal Reasoning between grades 5 and 8.

In addition an intermediate phase of mental growth deceleration seems to precede the mental growth spurt--in the Higher Level male and Medium Level female samples. This deceleration phase might be similar to that occurring in physical growth, immediately before the start of the pre-adolescent physical growth spurt.

There might also be differences in timing of mental maturation between the perceptual, numerical and verbal modi of Formal Reasoning, but the evidence from our data is too scarce to allow any definitive conclusions.

Although results obtained with parametric correlations generally support the findings of the non-parametric matched pairs analysis they would be difficult to interpret without the supplementary information gained by the latter, besides the fact that the determination of the critical phase of the mental growth acceleration would have been impossible without the matched pairs technique using criteria of physiological maturation assessed by the comparison of longitudinal growth patterns in individual subjects.

Paradigmatically, this study seems to demonstrate that the exploration of maturational factors in child development has too readily been abandoned, because of unsatisfactory results which might be due to inadequate methodology.

The patterns of interaction of physical and mental growth are by no means straightforward, linear and fitting traditional designs of correlational data analysis. Besides, intervening variables, such as season of birth, parental educational background, and chronological age must be controlled in a much more rigorous manner than has hitherto been practiced.

At this stage of explorations, it is difficult to delineate definitive practical implications. However, in the light of our findings it seems doubtful whether pre-adolescence and early adolescence are convenient times to carry out screening procedures leading to crucial choices of scholastic or vocational careers.

Also, if populations of these age groups are used for standardization of mental tests attention should be paid to a fair representation of maturational stages, while chronological age is kept constant.

As to the culturally disadvantaged, pre-adolescence and early puberty should be treated as critical periods of educational enrichment and stimulation, possibly not less important than the pre-school years on which most re-educational programs have hitherto been focused.

Last but not least, cross cultural validation of our results should be recommended, as other climatological, ethnic and socio-economic factors may lead to the emergence of a different picture of interaction between physiological and mental growth and possibly add new dimensions to those uncovered by this study.

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APPENDIX I

GROUP TEST OF FORMAL REASONING

GROUP TESTS OF FORMAL REASONING

a. Numerical Analogies

Each item is composed of three pairs of numbers exposing an arithmetic relationship. The task is to find the missing number of the fourth incomplete pair.

5	7
6	8
3	5
7	...

The missing number is 9, the exposed arithmetic relationship is $b = a + 2$.

The test is composed of groups of items, each group exposing a different arithmetic relationship in ascending order of difficulty. Besides simple addition, abstraction, multiplication and division, the following "complex" relations are presented:

$b = 2a + 1$

$b = 2a + 2$

$b = 2a - 1$

$b = 2a - 2$

$b = \frac{a + 1}{2}$

$b = \frac{a + 2}{2}$

$b = \frac{a - 1}{2}$

$b = \frac{a - 2}{2}$

$b = a^2$

$b = a^3$

$b = \frac{a - 1}{3}$

$b = \frac{2a}{3}$

$b = \frac{3a}{4}$

$b = \frac{2a}{5}$

$b = \frac{3a}{5}$

b. Verbal Analogies--Part I

The items of this test are composed of two word pairs. The first pair exposes a defined relationship. The analogous pair has to be constructed by the selection of two words, each presented among three distractors, as shown in the following example:

black is to white as .... to ....

shiny	dirty
dark	gloomy
pale	bright
black	night

The correct answer is dark to bright. The distractors have been constructed by a predetermined formula, so that certain choices are possible which show that the Subject has understood the structure of the analogy (in our example, contrasting adjectives), but confused the direction of the relationship: in our example such a response would be "Black is to white as shiny is to gloomy." This solution is scored as "Directional Error," whereas other incorrect answers are considered as "Structural Errors."

c. Verbal Analogies--Part II

Each item consists of a combination of two analogies, linked by a common element. The structures of the two analogies are different, so that the correct solution demands the integration of two relationships, as well as the flexible handling of the "common element" which has to be fitted into two contexts. Again, a solution at an intermediate level is possible by completing correctly only one of the analogies.

Example:

bird
river
plant
wind

.... is to fruit AS tree is to ....

apple
rose
leaf
seed

is to water

AS

animal is to ....

flower
rain
air
dog

The correct answer is: "Apple is to fruit AS tree is to plant is to water AS animal is to air." "Plant" is the "common element."

d. Questionnaire of Deductive Reasoning--Part I

This part consists of "related series problems," such as those used in Donaldson's study ( ). Example:

> If the biggest things were the most flexible, which of the following would be the most flexible?
>
> 1. shoe 2. spring 3. door 4. rubber 5. pillar
> 6. automobile tire.
>
> The correct answer is "pillar."

It will be noted that this problem demands as a first step to establish two first order relations, i.e. two seriations, consisting in the arrangement of the objects by size and by flexibility. This first step requires reasoning at the level of concrete operations only. As a second step, those two relations must be interpreted as interdependent on the basis of a second order relation, i.e. the implication that size implies flexibility. Furthermore, attention must be given to the direction of the implication, which means that the exposed relationship does not imply the opposite, i.e. that flexibility implies size. Finally, the formal deduction must be defended against the dissonance with the perceptual experience i.e. "a pillar being the most flexible object." It is evident that the latter three mental activities require operations at the formal level, in the sense of Piaget's and Lunzer's definition: (a) Establishment of second order relations; (b) Correct definition of their directions; (c) Complete emancipation of the mental activity from empirical knowledge.

e. Questionnaire of Deductive Reasoning--Part II

The task of this test is the deduction of absurd consequences as shown in the following example:

> If summer would be called "winter," which of the following consequences would be correct?
>
> 1. The longest nights in our country would be in summer.
> 2. The winter would be the warmest season.
> 3. The sea of Tiberias would freeze.
> 4. We would put on furs in the summer.
> 5. People would wear bathing suits with long sleeves.

The logical structure of this problem is as follows: By transforming the name of the category "A" (summer), all its known qualities and dimensions apply to the category "B" (winter). Again, this does not imply a transformation in the opposite direction. Therefore the correct answer is distractor 2. Choice of distractor 7 would be correct if the winter would be called "summer," i.e. by changing the direction of the relation. Such a solution of the problem is again scored as "Directional Error." The rest of the distractors present no logical deduction from the premise, but associations and probable consequences, based on perceptual experience.

The task requires again: (1) the classification of events (the establishment of first order relations); (2) their re-interpretation by logical deduction and elaboration of second order relations; (3) the formal operation leads to a consequence which is absurd according to empirical knowledge; (4) the direction of the second order relation must be defined, in order to find the correct solution.

APPENDIX II

INTER-CORRELATIONS BETWEEN MENTAL AND PHYSICAL VARIABLES (ERROR SCORES NOT INCLUDED) IN GRADES NOT SUBDIVIDED BY SEASON OF BIRTH*

---

*Lower Level Population has been included in order to keep range of scores moderately restricted.

Table 51a

GRADE 5 - BOYS

VARIABLE														
N.A.														
V.A. I	55													
V.A. IIa	55	90												
V.A. IIb	68	41	39											
Q.D.R. I	55	36	32	58										
Q.D.R. II	28	30	26	34	40									
M. VOC	58	54	53	46	34	28								
M.S.C.	40	83	90	7	15	14	48							
M. CON	50	82	85	23	25	26	57	85						
RAVEN	51	64	65	40	32	25	56	56	65					
G.S.A.T.	48	43	42	37	22	13	42	38	40	51				
HEIGHT	15	16	16	28	23	21	24	08	11	20	10			
WEIGHT	-11	-01	00	16	01	03	09	-04	-03	01	01	70		
DENTAL	-04	20	24	00	05	10	-03	24	05	05	07	08	15	
C.A.	09	-02	-03	14	07	-07	06	-10	-09	-07	00	01	13	21
Variable	N.A.	V.A.I	V.A.IIa	V.A.IIb	Q.D.R.I	Q.D.R.II	M.VOC	M.S.C.	M.CON	RAV.	G.S.A.T.	Height	Weight	Dental

Table 51b

GRADE 6 --- BOYS

VARIABLE														
N.A														
V.A.I	62													
V.A.IIa	58	75												
V.A.IIb	51	72	94											
Q.D.R.I	44	45	37	33										
Q.D.R.II	17	07	06	05	28									
M.VOC	22	39	47	50	01	01								
M.S.C.	42	39	47	47	24	02	50							
M.CON	20	27	33	32	-08	00	85	39						
RAV	44	51	48	45	12	-03	66	33	63					
G.S.R.T	32	32	26	25	33	-11	-13	09	-23	14				
HEIGHT	10	09	-01	00	09	-02	16	33	15	06	02			
WEIGHT	04	09	-02	00	-03	-02	17	32	15	03	17	75		
DENTAL	-08	02	-19	-15	00	00	-19	-12	-03	-15	16	28	30	
C.A	00	04	08	00	13	-07	-05	09	07	14	09	27	10	23
VARIABLE	N.A	V.A.I	V.A.IIa	V.A.IIb	Q.D.R.I	Q.D.R.II	M.VOC	M.S.C.	M.CON	RAV	G.S.R.T.	HEIGHT	WEIGHT	DENTAL

Table 51c

GRADE 7 - BOYS

VARIABLE															
N.A															
V.A.I.	58														
V.A.IIa	47	64													
V.A.IIb	51	59	92												
Q.D.R.I	49	60	44	35											
Q.D.R.II	41	41	42	41	44										
M.VOC	49	43	44	43	39	30									
M.S.C.	53	65	60	52	62	42	48								
M.A	63	57	51	46	62	45	53	69							
M.CON	43	58	37	36	46	15	48	49	53						
RAV	42	48	39	45	30	22	27	44	44	51					
G.S.R.T	61	57	50	47	44	42	34	64	49	45	41				
HEIGHT	07	-23	-18	-10	-21	-17	13	-21	02	01	o4	-04			
WEIGHT	16	-24	-14	-4	-26	-23	05	-15	-12	-17	00	-03	64		
DENTAL	-11	-17	-09	-11	-26	-13	-19	-14	-10	04	-03	-14	50	23	
C.A	-14	-01	-03	-08	-18	-02	00	-06	-04	-03	-17	-03	22	08	50
VARIABLE	N.A	V.A.I	V.A.IIa	V.A.IIb	Q.D.R.I	Q.D.R.II	M.VOC	M.S.C.	M.A	M.CON	RAV	G.S.R.T.	HEIGHT	WEIGHT	DENTAL

Table 51d

GRADE 8 -- BOYS

VARIABLE															
N.A															
V.A.I	61														
V.A.IIa	62	78													
V.A.IIb	46	61	80												
Q.D.R.I	58	47	52	52											
Q.D.R.II	11	28	16	17	21										
M.VOC	51	57	54	40	32	10									
M.S.C.	55	79	67	47	32	20	60								
M.A.	-03	-08	-08	39	39	07	-12	-11							
M.CON	51	52	55	52	24	03	47	58	36						
RAV	47	45	54	52	25	-07	04	32	31	31					
G.S.A.T	52	50	51	50	22	-05	40	41	37	48	50				
HEIGHT	20	20	25	14	-4	-05	21	27	-10	09	05	14			
WEIGHT	07	13	17	05	-11	-09	05	21	-09	04	-03	-02	62		
DENTAL	-03	16	-05	01	-12	23	00	05	04	-05	09	09	08	18	
C.A	31	19	14	9	16	19	16	21	-06	13	03	05	28	06	25
VARIABLE	N.A.	V.A.I	V.A.IIa	V.A.IIb	Q.D.RI	Q.D.RII	M.VOC	M.S.C.	M.A	M.CON	RAV	G.S.A.T.	HEIGHT	WEIGHT	DENTAL

Table 52a

GRADE 5 -- GIRLS

VARIABLE														
N.A														
V.A.I	25													
V.A.IIa	30	46												
V.A.IIb	31	59	35											
Q.D.R.I	06	56	37	48										
Q.D.R.II	-04	35	21	30	24									
M.VOC	30	57	53	50	52	30								
M.S.C.	05	11	10	10	10	20	-01							
M.CON	48	55	53	47	51	21	60	15						
RAV	11	51	13	38	44	16	46	30	44					
G.S.A.T	20	48	45	49	30	24	44	21	46	53				
HEIGHT	-15	11	05	21	15	06	11	12	00	12	16			
WEIGHT	-11	-15	-10	-02	00	-12	-13	18	-14	-04	-03	71		
DENTAL	-09	06	06	-02	-11	-14	-08	19	-14	-18	-10	-39	36	
C.A.	-12	07	01	-01	03	00	-13	03	-08	-01	08	18	07	20
VARIABLE	N.A	V.A.I	V.A.IIa	V.A.IIb	Q.D.R.I	Q.D.R.II	M.VOC	M.S.C	M.CON	RAV	G.S.A.T	HEIGHT	WEIGHT	DENTAL

Table 52b

GRADE 6 -- GIRLS

VARIABLE														
N.A														
V.A.I	47													
V.A.IIa	55	66												
V.A.IIb	50	65	93											
Q.D.R.I	38	55	61	62										
Q.D.R.II	33	39	30	26	34									
M.VOC	49	53	53	53	40	33								
M.S.C	43	51	54	51	53	31	65							
M.CON	48	58	46	47	48	23	56	56						
RAV	56	54	63	61	48	45	38	42	35					
G.S.A.T	49	42	56	57	57	23	38	41	45	62				
HEIGHT	10	13	13	13	15	21	15	19	18	05	-02			
WEIGHT	-13	-04	-01	-05	01	13	00	08	0[illegible]	-05	-21	68		
DENTAL	-15	-11	00	-01	06	-07	03	-03	03	-12	-08	48	42	
C.A	01	-04	01	03	-02	06	-12	-01	-04	11	02	10	16	19
VARIABLE	**N.A**	**V.A.I**	**V.A.IIa**	**V.A.IIb**	**Q.D.R.I**	**Q.D.R.II**	**M.VOC**	**M.S.C.**	**M.CON**	**RAVEN**	**G.S.A.T.**	**HEIGHT**	**WEIGHT**	**DENTAL**

Table 53a

GRADE 7 — GIRLS

VARIABLE															
N.A															
V.A.I	50														
V.A.IIa	61	76													
V.A.IIb	60	71	94												
Q.D.R.I	54	46	50	47											
Q.D.R.II	49	51	54	56	46										
M.VOC	32	60	57	54	32	36									
M.S.C.	45	67	71	65	46	60	71								
M.A.	44	68	63	58	46	53	64	64							
M.CON.	49	71	70	68	45	43	61	66	64						
RAVEN	48	57	58	54	55	37	31	41	48	54					
G.S.A.T.	38	39	38	36	38	34	23	45	32	40	50				
HEIGHT	28	21	20	22	17	23	6	20	14	19	10	14			
WEIGHT	01	04	15	14	-02	03	09	14	05	09	03	03	31		
DENTAL	07	20	17	17	14	06	23	18	16	21	22	14	22	61	
C.A.	01	08	01	01	14	07	06	01	-01	03	09	08	20	10	19
VARIABLE	N.A.	V.A.I.	V.A.IIa	V.A.IIb	Q.D.R.I	Q.D.R.II	M.VOC.	M.S.C.	M.A.	M.CON.	RAVEN	G.S.A.T.	HEIGHT	WEIGHT	DENTAL

Table 53b

GRADE 8 -- GIRLS

VARIABLE	N.A.	V.A.I	V.A.IIa	V.A.IIb	Q.D.R.I	Q.D.R.II	M.VOC.	M.S.C.	M.A.	M.CON.	RAVEN	G.S.A.T.	HEIGHT	WEIGHT	DENTAL
N.A.															
V.A.I	60														
V.A.IIa	55	52													
V.A.IIb	54	50	96												
Q.D.R.I	21	37	39	43											
Q.D.R.II	43	39	28	28	24										
M.VOC.	37	48	54	49	24	28									
M.S.C.	40	56	63	61	45	40	58								
M.A.	46	62	42	42	37	27	52	57							
M.CON.	43	57	43	44	21	33	50	52	65						
RAVEN.	45	58	46	41	21	28	34	31	32	30					
G.S.A.T.	57	55	59	59	23	18	33	37	41	38	49				
HEIGHT	00	18	09	08	-08	-04	22	12	00	02	01	27			
WEIGHT	-03	05	02	05	09	-07	-02	02	-15	-16	-06	14	39		
DENTAL	11	11	-09	-06	01	06	11	-06	16	21	05	11	-16	-20	
C.A.	08	15	05	05	17	-08	-09	-04	12	06	16	-02	-05	-08	02

APPENDIX III

PATTERNS OF PHYSICAL, DENTAL** AND MENTAL DEVELOPMENT

LEGEND OF SLANTED TRYAD:

Upper left underlined number = mean
Middle number = SD
Lower right number = N

*Indicates incidence of the younger summer born subjects of the same grade (and classrooms) having equal or higher scores in comparison to the half-a-year older winter born classmates.

**Results of dental examinations where scored using an index based on a method proposed by Adler-Hradecky (1). Four points are scored for every erupted permanent tooth. One point is given for any shaky deciduous tooth, and two points for a shedded deciduous tooth, even if the permanent one is still not apparent. This results in a maximum score of 112, as the third molar is still missing at the ages of our sample.

TABLE 54

HEIGHT (cm)

BOYS

Grade	5			6			7			8			9		
High Level Winter	141.9 5.31 24	145.1 5.19 22	145.3 5.79 24	148.9 6.28 21	150.3 6.44 19	152.2 6.75 20	153.0 7.18 11	156.3 7.56 11	158.0 7.47 11	160.8 7.70 11	164.5 8.55 10	164.5 8.55 10			
				148.9 8.38 19	151.3 8.73 19	154.5 10.03 17	155.9 9.65 15		160.8 10.10 17	163.3 7.78 22	164.6 7.39 23	166.7 7.68 22	169.9 7.36 14		173.0 5.84 15
High Level Summer	141.6 5.46 16	144.1 4.44 15	144.7 4.67 15	147.5 4.71 13	149.0 5.03 15	151.0 5.47 15	148.1 7.45 21	150.7 7.85 19	152.5 7.86 21	155.6 [illegible] 19	157.7 9.52 19	159.5 9.66 19			
				143.7 6.35 21	146.6 6.83 20	148.6 7.07 20	152.3 8.53 15	153.0 8.94 18	154.8 9.41 17	155.9 7.14 13	157.7 8.21 12	160.6 8.03 13	166.6 6.29 10		170.0 7.03 9
Medium Level Winter	139.5 7.08 32		141.4 7.42 32	144.3 7.43 32	146.3 7.70 29	148.9 11.92 31	153.6 7.88 21	154.5 7.15 16	157.6 8.31 27	162.2 8.53 13	162.5 7.84 12	163.5 9.08 18			
				146.2 6.15 34	147.8 5.45 25	148.1 6.27 32	151.0 7.10 28	153.0 7.64 29	154.8 7.83 27	160.1 9.43 19	161.1 9.24 13	162.0 8.17 18			
Medium Level Summer	139.7 5.25 31		141.9 5.52 30	144.7 5.58 29	146.0 5.93 28	147.7 6.12 27	148.7 8.90 22		152.7 9.58 23	158.0 11.16 13	160.1 10.90 13	162.0 10.65 23			
				143.7 6.96 12	145.7 6.76 11	146.7 6.86 12	149.2 7.49 11	151.4 7.39 11	154.0 8.11 10	158.3 11.65 18		162.1 12.21 17			
Low Level Winter	139.4 6.34 9	140.3 6.46 9	140.3 7.16 8	145.6 6.74 8	148.9 7.54 8		149.0 5.76 9	151.9 5.96 9	153.6 6.48 9	155.9 6.71 9	161.4 7.37 10	164.0 7.95 10			
				141.6 7.03 11	143.0 7.23 11	145.1 7.47 11	147.2 8.32 11	150.1 9.09 11	152.6 10.09 10	156.2 6.94 5	157.1 7.33 5	158.2 7.64 4			
Low Level Summer	135.4 9.27	136.6 9.28	137.6 8.89	144.4 8.25	147.9 9.14	147.7 9.20	142.4 9.01		144.3 10.46 6	151.3 8.62 4		157.6 9.07 4			
				142.9 6.49 6	144.7 6.76 6	148.9 7.32 5	152.0 8.09 5	155.8 8.29 5	158.6 8.47 5						

TABLE 55

WEIGHT (kg)

BOYS

Grade	5			6			7			8			9		
High Level Winter	37.4 6.18 24	38.7 6.05 21	39.6 6.89 24	43.6 7.14 21	44.1 8.07 19	45.4 8.59 20	46.5 7.07 11	47.8 6.70 11	48.7 6.82 11	52.2 6.72 11	54.1 8.68 10	52.8 7.58 11			
				38.3 8.58 19	41.4 8.39 19	42.9 9.45 17	45.8 10.72 15		48.6 10.24 17	53.2 10.47 22	54.7 10.80 23	55.2 10.80 22	58.4 10.43 14		59.9 10.12 15
High Level Summer	35.3 5.51 16	37.3 6.45 15	36.6 6.05 15	40.1 5.26 13	41.1 6.12 15	41.5 6.63 15	43.6 8.60 21	44.0 8.38 19	44.0 7.76 21	47.0 8.14 19	49.2 8.26 19	49.3 8.55 19			
				37.5 7.91 21	40.1 8.47 20	40.8 8.07 20	43.7 9.71 15	43.7 9.14 18	43.8 9.37 17	48.7 14.77 13	47.0 7.0 12	48.7 7.02 13	54.3 6.45 10		57.0 7.79 9
Medium Level Winter	36.2 10.09 32		36.7 10.65 32	39.7 11.48 32	41.5 11.73 29	40.9 11.90 31	45.4 8.99 21	46.8 10.0 16	46.8 9.70 22	43.3 8.54 13	50.6 8.63 12	51.3 9.76 18			
				39.3 6.28 34	39.9 6.57 25	40.2 6.88 32	43.4 8.30 28	45.4 9.03 29	47.2 9.53 27	46.7 8.72 19	35.1 9.34 13	49.2 9.03 18			
Medium Level Summer	33.2 5.25 31		33.9 5.35 30	35.4 6.29 29	36.7 5.90 28	36.7 6.59 27	42.9 9.39 22		44.2 10.09 23	50.0 12.71 13	52.1 12.61 13	51.8 10.68 23			
				37.5 7.01 12	39.0 6.86 11	37.7 6.33 12	41.9 8.53 11	43.7 8.86 11	45.7 9.71 10	49.9 8.94 18		51.0 10.48 17			
Low Level Winter	31.7 3.27 9	33.1 3.23 8	32.8 3.44 8	34.4 3.56 8	35.2 3.69 8		38.9 5.97 9	39.9 5.89 9	41.5 6.22 9	45.4 7.12 9	47.2 7.04 10	48.5 7.0 10			
				33.5 6.07 11	34.5 6.65 11	34.9 6.99 11	37.2 7.96 11	39.2 7.92 11	39.7 9.03 10	48.5 7.55 5	51.0 8.15 5	51.4 9.76 4			
Low Level Summer	29.7 5.50 8	31.6 5.47 8	30.3 6.52 7	35.7 8.29 6	36.2 8.04 6	35.4 9.03 5	34.4 6.07 6		36.7 8.17 6	42.4 7.76 4	40.3 10.0 5	45.5 7.91 4			
				34.9 4.69 6	36.5 4.74 6	37.2 4.97 5	41.2 5.01 5	43.3 5.87 5	44.2 5.71 5	40.3 2.76 2	43.8 6.65 2	43.7 7.71 2			

TABLE 56

DENTAL INDEX

BOYS

Grade	5			6			7			8			9		
High Level Winter	69.6 14.6 24	80.5 18.5 28	84.5 19.0 22	94.8 12.9 19		101.8 10.5 19	108.4 6.7 10	109.8 5.2 11	110.9 3.6 11	112.0 0.0 10	112.0 0.0 9	112.0 0.0 10			
				81.6 22.5 19	89.9 20.4 16	96.2 17.0 19	101.1 11.9 17	112.0 0.0 6	104.9 7.6 16	110.3 3.7 23	110.7 2.3 3	112.0 0.0 18	112.0 0.0 11	112.0 0.0 3	112.0 0.0 12
High Level Summer	63.4 19.3 16	66.7 18.4 14	78.8 20.7 12	81.0 23.0 12		91.9 19.0 14	88.8 18.9 20	96.7 14.6 18	101.0 11.9 17	106.5 6.0 15	110.0 3.7 8	109.0 4.6 14			
				74.3 21.0 20	85.3 20.0 15	86.1 17.8 17	94.0 15.1 15	112.0 0.0 3	102.1 11.4 18	103.1 13.8 13	100.4 12.0 5	112.0 0.0 9	112.0 0.0 7		112.0 0.0 6
Medium Level Winter	70.6 21.8 22		77.1 23.1 21			91.5 20.5 19	108.0 11.3 16	110.0 6.2 15	110.0 3.9 15	112.0 0.0 9	112.0 0.0 9	112.0 0.0 11			
				92.6 18.0 26	112.0 0.0 5	112.0 0.0 5	112.0 0.0 5	112.0 0.0 4	110.3 4.3 21	109.8 4.0 12	112.0 0.0 8	112.0 0.0 7			
Medium Level Summer	66.4 17.7 18		73.2 19.6 18	0 0.1 0	0 0.0 0	93.1 13.9 18	99.5 17.9 13		108.9 4.4 9	112.0 0.0 4	112.0 0.0 4	112.0 0.0 5			
				86.9 20.6 9	0.0 0.1 0	0.0 0.1 0	0.0 0.1 0	0.0 0.1 0	107.6 11.9 9	108.1 8.5 14		112.0 0.0 8			
Low Level Winter		78.3 26.0 8	145.0 177.4 8	92.9 21.6 7	112.0 0.0 3		106.5 11.1 8	108.0 6.8 10	111.5 1.4 8	110.7 2.8 9	12.0 0 3	11.2 1.7 10			
					91.6 23.3 10	94.9 21.4 9	107.3 5.8 8	112.0 0.0 4	109.4 3.4 7	108.8 7.2 5	110.0 4.5 5	112.0 0 4			
Low Level Summer	68.4 25.0 5	70.4 19.7 8	156.6 222.8 7	102.8 6.7 5		107.2 4.4 5	103.6 15.6 5	104.5 13.1 6	106.7 12.1 6	112.0 0.0 4	112.0 0.0 2	111.0 2.0 4			
				105.8 7.3 4	101.7 18.1 6	104.0 16.7 6	111.6 0.9 5	112.0 0.0 4	112.0 0.0 4	106.0 8.5 2	108.0 5.7 2				

TABLE 57
HEIGHT (cm)
GIRLS

Grade	5			6			7			8			9	
High Level Winter	143.3 4.28 19	144.9 4.69 17	147.0 4.60 19	149.2 4.63 17	150.7 4.78 18	152.6 4.60 19	154.1 5.38 17	156.9 5.55 16	158.3 5.61 16	160.0 5.46 17	160.9 5.15 17	161.8 5.14 16		
				147.0 5.57 16		152.2 5.68 16	154.7 5.33 16		157.6 5.04 16	157.7 5.01 13	159.6 4.93 12	160.7 4.51 13	162.1 5.20 8	162.9 5.12 8
High Level Summer	137.9 5.34 18	140.3 5.09 18	142.6 4.94 16	145.8 4.73 17	147.6 4.81 17	150.0 5.11 17	153.3 8.65 15	156.0 8.27 16	157.3 8.06 16	157.8 7.20 15	159.0 7.32 15	159.3 6.28 15		
				143.5 7.98 21		149.3 7.70 22	151.7 7.62 22	152.3 6.72 21	155.3 6.69 21	159.8 6.41 19	162.0 6.64 17	162.3 6.52 19	162.1 6.05 16	162.8 6.65 15
Medium Level Winter	139.1 5.14 29	139.8 5.68 18	143.8 9.66 29	146.1 5.95 29		148.5 6.47 29		151.9 4.05 15	153.3 4.85 21	154.3 7.74 20	156.3 6.16 27	156.7 5.48 22		
				145.4 7.41 24		148.5 8.06 24	152.2 7.71 22	153.6 7.80 22	154.4 7.43 21	155.6 5.81 24	156.2 5.80 15	157.2 5.95 22		
Medium Level Summer	137.7 5.90 23	139.7 6.86 12	140.6 6.45 22	143.7 6.77 22	144.1 5.71 21	147.0 6.85 22	150.6 6.30 21	153.2 6.25 15	153.8 6.36 20	155.3 5.43 20	156.4 4.97 20	158.7 6.41 20		
				144.7 6.50 31	146.0 5.63 18	147.7 6.59 31	150.4 6.96 27	151.6 6.56 26	153.0 6.28 28	154.7 3.05 20	156.2 3.34 15	156.9 3.48 20		
Low Level Winter	135.5 5.72 13	136.9 5.81 13	140.1 6.18 12	144.6 5.33 10	148.4 5.78 8	152.5 5.65 10	150.7 3.64 12	152.3 3.17 12	154.7 2.95 11	155.5 2.38 11	160.9 3.14 9	163.4 3.47 9		
				148.9 6.05 5	151.0 6.08 5	153.1 5.90 5	154.2 4.97 5	158.9 6.51 5	162.3 7.40 5	154.2 8.58 8	154.3 8.56 7	155.1 8.48 7	156.2 7.89 6	159.1 9.25 6
Low Level Summer	134.4 4.10 18	136.3 3.72 17	139.1 4.06 18	142.3 4.92 14	145.4 5.50 13	148.7 6.19 13	143.4 7.97 9	145.6 8.06 9	150.3 8.83 10	152.1 8.96 10	157.4 8.47 10	161.0 8.10 10		
				139.4 6.16 8	141.3 5.86 8	143.4 6.02 8	146.1 6.56 8	150.7 6.41 7	153.4 8.01 6	158.6 2.63 4	159.3 3.01 4	161.0 1.0 4		

TABLE 58

WEIGHT (hg)

GIRLS

Grade	5			6			7			8			9		
High Level Winter	35.2 6.34 19	37.5 7.49 17	38.1 7.18 19	41.5 7.55 17	41.2 7.18 18	42.4 6.94 19	43.2 7.17 17	44.2 6.96 16	44.6 7.16 16	47.8 7.44 17	48.2 7.12 17	48.1 6.79 16			
				39.6 8.28 16	41.1 8.04 15	42.4 8.41 16	45.6 8.10 16	43.7 13.16 15	47.6 8.05 16	48.3 7.36 13	49.5 7.45 12	49.8 6.72 13	51.5 7.64 8		53.0 7.51 8
High Level Summer	32.3 6.71 18	34.6 7.35 17	36.0 7.28 16	38.4 7.70 17	39.5 7.56 17	40.5 7.52 17	45.9 8.29 15	47.4 8.11 16	48.0 7.79 16	49.9 7.13 15	50.7 6.46 15	51.2 6.12 15			
				35.3 7.37 21	40.0 14.45 22	39.2 7.73 22	41.7 8.60 22	42.2 19.0 21	42.5 11.82 21	51.6 8.03 19	53.2 8.63 17	53.2 8.63 19	55.1 8.03 16		55.5 9.05 15
Medium Level Winter	33.3 6.38 18	33.3 7.35 17	35.0 7.28 16	37.8 7.70 17	7.56 17	40.1 7.52 17	45.2 8.29 15	45.8 8.11 16	46.1 7.79 16	49.0 7.13 15	49.0 6.46 15	49.6 6.12 15			
				40.5 8.05 24	42.4 9.41 15	42.2 8.57 24	45.9 8.94 22	47.4 8.55 22	47.6 8.19 21	49.5 8.67 24	51.1 8.74 15	50.6 9.49 22			
Medium Level Summer	32.9 6.33 23	33.1 6.59 12	34.4 6.94 22	37.0 7.40 22	30.3 16.88 21	38.7 7.60 22	42.8 8.29 21	45.5 8.86 15	44.6 8.28 20	47.8 7.99 20	48.9 7.48 20	49.9 7.29 20			
				38.6 8.88 31	38.7 7.22 18	40.4 8.87 31	43.1 10.21 27	44.3 10.63 26	45.8 10.73 27	49.3 8.25 20	50.7 8.38 15	49.7 7.95 20			
Low Level Winter	30.5 3.04 13	31.3 3.08 13	31.7 3.71 12	34.8 3.63 10	36.9 3.44 8	35.9 2.87 10	40.8 3.88 12	42.2 3.91 12	43.4 4.34 11	42.9 10.28 11	46.9 2.26 9	46.2 2.45 9			
				41.1 7.80 5	42.8 8.0 5	43.5 7.69 5	47.6 8.0 5	48.4 8.33 5	48.4 7.71 5	44.1 7.69 8	44.5 7.55 7	44.6 7.51 7	46.9 8.53 6	47.3 10.58 4	47.3 8.42 6
Low Level Summer	28.1 2.64 18	29.6 2.70 17	29.7 2.71 18	32.2 2.98 14	32.0 4.07 13	34.3 3.16 13	38.7 10.50 9	40.0 10.50 9	40.8 9.34 10	44.9 8.62 10	44.9 8.14 10	45.2 7.43 10			
				33.5 4.08 8	34.5 5.17 8	34.8 4.94 8	39.3 7.47 8	40.2 6.54 7	41.2 7.09 6	50.2 3.28 4	50.8 3.47 4	51.0 3.44 3	53.2 4.38 3	53.1 4.60 2	53.4 3.70 3

TABLE 59

DENTAL INDEX

GIRLS

Grade		5			6			7			8		9
High Level Winter	83.3 20.7 19	90.6 20.0 18	92.9 19.3 19	98.4 18.1 17		100.0 17.6 18	103.1 12.4 16	106.5 9.2 15	108.8 6.5 16	110.2 4.1 17	111.7 1.1 14	111.3 1.8 15	
				94.6 17.0 15	97.0 17.6 12	102.9 12.2 16	106.7 10.8 14		107.6 8.8 14	111.7 1.1 13	112.0 0.0 13	112.0 0.0 13	
High Level Summer	63.9 16.7 18	67.8 18.9 16	75.4 20.5 17	86.3 20.9 15		92.7 20.0 17	102.7 11.3 16	107.6 6.6 16	109.3 6.2 15	110.1 4.4 15	111.8 0.6 12	111.1 2.7 14	
				87.8 17.1 21	98.9 15.1 17	103.9 12.3 21	107.9 8.3 19		103.4 24.7 17	111.2 2.1 18	111.8 0.9 18	112.0 0.0 18	
Medium Level Winter	139.1 51.4 29	139.8 56.8 18	143.8 96.6 29	146.1 59.5 29		148.5 64.7 29	106.7 12.7 12	112.0 0.0 7	111.6 1.2 11	112.0 0.0 9	112.0 0.0 10	112.0 0.0 12	
				94.5 19.0 13	112.0 0.0 2	112.0 0.0 4	112.0 0.0 5	112.0 0.0 5	107.8 8.4 11	111.1 2.2 16	112.0 0.0 13	112.0 0.0 11	
Medium Level Summer	81.1 22.9 13	112.0 0.0 3	87.2 20.0 13	112.0 0.0 3	112.0 0.0 3	102.3 11.7 12	100.6 15.6 15	112.0 0.0 8	109.3 5.8 12	112.0 0.0 9	112.0 0.0 9	112.0 0.0 9	
				91.9 20.3 15	112.0 0.0 6	112.0 0.0 3	112.0 0.0 5	112.0 0.0 5	107.0 10.9 12	110.5 3.6 15	112.0 0.0 12	112.0 0.0 13	
Low Level Winter	78.4 14.6 7	82.2 20.4 13	88.5 17.4 11	92.4 14.5 10	98.0 19.8 2	100.8 14.5 8	111.0 2.0 4	108.2 8.4 12	111.6 1.3 10	111.6 1.2 11	112.0 0.0 8	111.6 1.3 9	
				112.0 0 2	108.8 4.4 5	111.0 2.0 4	112.0 0 3	112.0 0 3	112.0 0 3	105.0 11.2 8	106.3 9.1 8	111.5 1.0 4	
Low Level Summer	68.2 18.6 13	78.2 20.1 18	85.4 19.1 17	96.6 13.4 13	112.0 0.0 3	104.2 11.3 10	88.7 27.7 3	101.8 17.8 9	103.8 15.0 9	106.9 11.5 9	112.0 0.0 7	111.3 2.1 8	
				101.3 16.7 6	102.0 15.4 8	105.3 9.1 8	108.4 8.0 5	112.0 0 4	112.0 0 4	112.0 0 4	112.0 0 4	112.0 0 3	

TABLE 60

NUMERICAL ANALOGIES
(CORRECT RESPONSES)

BOYS

Grade	5		6		7		8		9	
High Level Winter	14.7 9.1 21	20.4 9.7 23	22.3 10.8 16	26.8 8.4 18	22.1 6.3 11	30.5 3.6 8	27.8 6.3 9	32.9 2.7 8		
			22.7 6.0 17	23.8 8.3 19	25.5 3.2 19	27.5 8.3 15	26.0 8.0 21	-- -- --	31.8 3.6 10	-- -- --
High Level Summer	14.2 6.0 13	*23.1 7.0 14	*25.5 6.5 11	*28.3 7.9 12	*22.4 6.3 18	28.1 4.9 17	*29.9 6.3 19	32.1 4.1 19		
			19.8 8.8 19	23.6 10.2 19	24.8 9.3 15	*27.9 7.2 17	21.3 10.4 12	-- -- --	*31.8 2.8 5	-- -- --
Medium Level Winter	12.7 6.8 30	17.6 6.6 33	22.4 6.5 32	25.0 7.9 27	18.2 7.3 21	20.6 8.6 22	23.3 8.1 15	27.5 7.2 17		
			15.3 5.9 26	19.1 6.0 28	21.4 7.0 26	23.7 7.5 23	24.4 6.9 14	24.9 8.0 17	-- -- --	
Medium Level Summer	11.9 8.5 29	18.1 8.4 29	21.1 9.2 25	22.1 7.3 26	17.3 7.5 21	*21.2 5.8 21	*23.8 7.5 21	*28.5 3.9 23		
			14.8 8.2 12	16.9 7.9 11	19.6 8.0 10	23.4 5.9 9	20.9 8.7 18	23.1 7.2 15		
Low Level Winter	8.8 5.5 8	12.4 6.9 8	13.6 8.3 8	14.4 7.2 7	14.0 7.7 9	18.5 7.7 10	22.3 9.9 8	21.1 8.6 9		
			13.3 7.0 10	16.2 7.6 11	17.2 8.5 11	16.4 6.1 9	14.0 4.9 5	20.8 5.1 4	-- -- --	23.5 5.0 2
Low Level Summer	7.9 5.2 8	6.7 6.8 6	10.1 7.9 6	13.0 6.7 4	*24.8 18.6 6	*19.4 7.7 5	*25.0 6.1 4	*25.8 6.6 4		
			*16.0 4.1 5	*16.2 5.1 6	10.6 7.7 5	12.5 2.6 4	*17.5 6.4 2	-- -- --	-- -- --	-- -- --

TABLE 61

NUMERICAL ANALOGIES
(ERRORS)

BOYS

Grade	5		6		7		8		9	
High Level Winter	9.2 11.6 21	9.1 11.0 23	8.6 9.0 16	5.7 7.9 18	3.5 3.3 11	1.9 1.8 8	3.2 3.3 9	1.1 1.4 8		
			2.4 2.5 17	7.9 9.2 19	6.7 7.9 19	7.4 8.3 15	4.7 7.7 21	-- -- --	3.8 5.6 10	-- -- --
High Level Summer	*4.7 7.0 13	*3.4 5.0 14	*4.2 4.8 11	*3.5 8.3 12	3.9 5.2 18	3.6 3.5 17	4.9 7.5 19	1.9 3.1 19		
			4.9 6.8 19	*7.3 8.3 19	*5.7 6.8 15	*2.9 4.7 17	*3.8 5.6 12	-- -- --	*2.4 2.3 5	-- -- --
Medium Level Winter	5.6 7.3 30	5.4 6.9 33	5.7 6.9 32	4.8 7.8 27	5.2 6.7 21	7.3 9.8 22	4.3 3.7 15	4.9 4.7 17		
			5.5 7.1 26	5.6 6.2 28	6.5 7.2 26	3.9 4.7 23	4.3 5.7 14	6.4 5.6 17		
Medium Level Summer	9.5 10.5 29	9.4 11.0 29	9.6 10.2 25	8.0 8.4 26	*3.7 4.1 21	*4.4 6.3 21	*4.3 7.1 21	*3.0 2.5 23		
			*5.1 6.5 12	9.8 11.6 11	*5.4 6.4 10	6.8 6.0 9	5.4 6.6 18	*6.4 6.4 15		
Low Level Winter	18.0 10.4 8	15.1 10.2 8	15.9 13.8 8	11.1 10.3 7	6.3 5.8 9	5.6 8.4 10	3.0 4.2 8	4.2 4.6 9		
			5.8 8.8 10	5.1 10.3 11	9.2 12.8 11	2.9 3.7 9	4.0 2.8 5	1.0 .8 4	-- -- --	.5 .7 2
Low Level Summer	*17.6 9.9 8	*13.7 12.1 6	*14.7 13.2 6	*9.8 7.9 4	19.3 34.9 6	*4.4 4.6 5	6.0 4.1 4	4.5 5.4 4		
			*5.0 4.6 5	6.5 4.7 6	21.0 14.1 5	11.5 11.8 4	9.0 4.2 2	-- -- --	-- -- --	-- -- --

TABLE 62

VERBAL ANALOGIES I
(CORRECT RESPONSES)

BOYS

Grade	5	6		7		8	
High Level Winter	13.1 6.4 23	16.8 4.8 15	17.4 6.4 18	19.5 4.9 11		20.4 4.2 10	23.3 2.7 10
		16.6 4.8 19		16.9 5.7 18	19.6 6.1 18	22.4 4.5 20	
High Level Summer	*13.9 5.7 14	*19.7 3.5 11	*21.1 5.2 13	*19.5 4.9 19		*22.4 2.5 18	23.2 3.8 18
		15.0 6.6 20		*17.9 4.3 17	*20.0 5.6 16	21.7 3.4 11	
Medium Level Winter	12.4 4.1 28	16.1 4.0 31	19.3 4.2 25	16.8 4.9 19		18.8 4.0 16	20.1 6.2 11
		15.0 4.4 29		17.8 4.6 26	20.8 3.9 28	17.6 4.7 18	
Medium Level Summer	10.4 5.1 30	15.1 5.5 27	17.7 4.8 24	15.9 6.2 19		18.5 4.5 22	*22.1 3.2 18
		13.5 6.7 4		14.5 6.9 10	*22.9 10.0 10	*18.1 5.7 12	
Low Level Winter				12.6 9.9 9		17.4 7.0 9	18.1 6.4 8
		8.2 4.7 10		9.9 4.0 11	13.2 3.4 11		
Low Level Summer				9.8 5.7 6		*17.8 5.4 4	16.3 6.3 4
		7.4 5.4 5		8.6 7.0 5	12.2 8.0 5		

TABLE 63

VERBAL ANALOGIES I
(DIRECTIONAL ERRORS)

BOYS

Grade	5	6		7		8		9
High Level Winter	3.5 2.0 23	2.7 2.0 15	2.8 1.9 17	2.5 2.0 11	--	1.5 1.2 10	1.2 1.1 10	--
		3.0 1.9 19		2.7 2.1 18	2.4 2.5 18			
High Level Summer	4.3 2.4 15	2.8 1.9 11	1.1 1.0 13	2.4 1.5 19		1.1 1.1 18	1.2 1.2 18	
		4.2 1.7 20		2.5 2.0 17	2.2 1.9 16			
Medium Level Winter	3.5 2.3 28	2.5 1.3 31	2.0 1.6 25	2.9 1.8 19		2.1 1.6 16	2.8 3.1 11	
		3.5 2.1 29		2.2 1.7 26	2.5 1.7 28			
Medium Level Summer	3.8 2.3 30	2.4 1.9 27	2.7 1.8 24	3.3 .94 19		2.4 1.8 22	2.1 1.6 18	
		2.9 2.3 11		2.3 1.3 10	2.0 1.8 10			
Low Level Winter				3.9 6.3 9		1.5 1.0 9	1.4 .9 8	
		2.5 2.0 10		2.5 2.4 11	2.5 1.1 11			
Low Level Summer				3.7 3.7 6		2.3 1.7 4	2.0 .8 4	
		2.6 .5 5		2.4 2.2 5	3.4 2.1 5			

TABLE 64

VERBAL ANALOGIES I
(STRUCTURAL ERRORS)

BOYS

Grade	5	6		7		8	
High Level Winter	8.3 5.5 23	7.2 4.1 15	5.2 4.4 18	3.5 2.2 11		3.9 3.3 10	2.4 2.1 10
		6.6 4.9 19		6.7 4.9 16	4.7 4.7 18		
High Level Summer	*6.9 4.5 14	*4.1 2.2 11	*3.7 3.3 13	4.3 3.8 19		*3.4 2.3 18	*2.1 1.9 18
		7.1 4.7 20		*5.0 1.9 17	*4.2 4.7 16		
Medium Level Winter	9.7 4.1 28	8.0 4.3 31	5.5 3.8 25	6.9 4.4 19		6.3 3.8 16	3.5 4.0 11
		7.5 3.7 29		7.2 5.4 26	3.3 2.5 28		
Medium Level Summer	10.3 4.8 30	9.0 5.5 27	6.3 4.3 24	7.3 4.2 19		*5.2 2.8 22	*2.6 1.8 18
		*6.7 4.1 11		9.4 5.2 10	4.9 3.6 10		
Low Level Winter				10.7 5.5 9		4.4 3.6 9	6.6 3.7 8
		10.9 5.2 10		10.0 6.4 11	9.0 3.2 11		
Low Level Summer				12.1 3.2 6		*4.0 .8 4	*5.8 4.4 4
		13.0 6.8 5		12.2 7.2 5	9.6 7.3 5		

TABLE 65

VERBAL ANALOGIES II
(CORRECTLY SOLVED SIMPLE ANALOGIES)

BOYS

Grade	5		6		7		8		9	
High Level Winter	11.1 5.2 23	11.3 5.2 23	13.5 5.2 15	13.7 14.6 18	15.9 3.8 11	17.0 2.9 8	17.7 2.4 10	14.9 4.6 9		
			13.6 4.7 19	13.3 4.3 18	15.2 4.1 17	16.0 3.7 18	16.4 3.6 17	-- -- --	17.9 2.8 10	-- -- --
High Level Summer	*11.9 4.2 15	*13.4 4.8 14	*14.7 3.1 11	*15.7 4.9 13	15 3.7 19	15.9 4.0 17	17.5 2.5 18	*17.8 2.6 17		
			12.7 4.9 21	12.7 4.2 19	*16.2 3.4 16	*16.3 3.5 16	*17.2 5.5 11	-- -- --	*19.0 1.3 6	-- -- --
Medium Level Winter	11.2 4.2 27	10.7 4.4 33	12.0 5.0 31	14.5 4.5 26	13.7 3.9 20	13.1 3.9 21	16.5 3.1 17	16.3 4.0 12		
			13.3 3.8 28	11.1 4.5 28	13.7 4.4 26	15.9 3.2 28	15.2 4.0 19	15.7 3.4 17		
Medium Level Summer	9.5 4.7 30	9.2 4.6 29	11.8 5.1 27	14.5 4.8 24	13.3 4.5 19	12.0 3.9 21	13.9 4.9 23	*17.2 3.6 20		
			10.9 4.8 11	9.0 4.2 11	12.3 4.6 10	14.1 3.4 9	13.9 3.9 16	15.0 4.6 15		
Low Level Winter	4.0 -- 2	4.1 2.0 8	4.0 3.3 7	7.6 4.9 7	11.6 7.2 10	11.2 4.7 10	13.4 5.0 10	14.7 5.6 9		
			7.6 3.4 9	5.4 3.2 11	6.4 4.1 10	10.4 4.2 11	14.4 2.1 5	14.8 4.6 4	17.0 1.4 2	15.5 4.9 2
Low Level Summer	*4.7 1.2 3	3.5 1.4 6	3.6 1.3 5	7.5 3.9 4	11.3 4.5 6	*11.4 4.4 5	*14.0 4.9 4	*16.8 2.5 4		
			6.4 4.5 5	*7.5 2.9 6	*6.8 5.3 5	*11.8 6.8 5	*16.5 4.9 2	-- -- --	-- -- --	-- -- --

TABLE 66

VERBAL ANALOGIES II
(CORRECTLY SOLVED TRIPLE ANALOGIES)

BOYS

Grade	5		6		7		8		9	
High Level Winter	3.1 2.6 23	2.8 2.6 23	3.8 2.9 15	4.6 2.5 18	5.3 2.2 11	6.0 2.3 8	6.5 1.6 10	5.1 2.1 9		
			4.0 2.5 19	4.1 2.0 17	5.1 2.2 17	5.3 2.1 17	5.8 1.9 17	-- -- --	6.5 1.8 10	-- -- --
High Level Summer	*3.1 1.8 15	*3.5 2.5 14	*5.1 1.6 11	*5.7 2.6 13	4.7 2.5 19	5.4 2.4 17	6.3 1.5 18	*6.5 1.6 17		
			3.7 2.6 21	3.4 2.3 19	*5.4 2.3 16	*5.6 2.1 16	*6.4 1.4 11	-- -- --	*7.3 .8 6	-- -- --
Medium Level Winter	2.8 2.1 27	2.4 2.1 33	3.3 2.6 31	4.8 2.2 26	3.9 2.1 20	3.7 2.0 21	5.5 1.9 17	5.3 2.7 12		
			3.3 2.1 28	2.9 2.4 28	4.2 2.4 26	5.1 2.0 28	5.0 2.2 19	5.1 2.2 17		
Medium Level Summer	2.4 2.1 30	1.9 1.9 29	*3.5 2.4 27	4.7 2.6 24	*4.0 2.2 19	2.9 1.9 21	4.3 2.2 23	*5.9 2.3 20		
			3.0 2.2 11	2.3 1.7 11	3.4 1.7 10	3.9 2.1 9	4.1 2.5 16	4.9 2.4 15		
Low Level Winter	.5 .7 2	-- -- 2	.4 .5 7	1.3 1.8 7	2.6 2.5 10	2.5 1.4 10	4.2 2.3 10	4.6 2.2 9		
			1.1 .9 9	.6 .7 11	1.5 1.2 10	2.1 1.6 11	4.2 1.5 5	4.5 2.4 4	6.0 1.4 2	5.5 2.1 2
Low Level Summer	.3 .6 3	-- -- 6	* .6 .5 5	1.0 1.2 4	1.7 .8 6	*2.6 1.7 5	*4.5 1.9 4	*5.8 1.3 4		
			*1.2 .8 5	* .7 1.7 6	1.4 1.5 5	*3.4 2.7 5	*6.0 2.8 2	-- -- --	-- -- --	-- -- --

TABLE 67

VERBAL ANALOGIES II
(STRUCTURAL ERRORS)

BOYS

Grade	5		6		7		8		9	
High Level Winter	8.1 5.1 23	6.7 4.7 23	6.1 5.0 15	5.1 4.6 18	3.5 2.7 11	2.4 2.5 8	1.9 2.0 10	3.1 4.0 9		
			5.8 4.6 18	5.9 4.6 18	5.3 4.4 15	3.9 3.1 17	3.5 3.6 17	-- -- --	1.3 1.9 10	-- -- --
High Level Summer	*7.5 3.9 15	*6.2 3.7 14	*4.9 2.9 11	*3.2 4.3 13	4.9 3.6 19	3.1 2.9 17	2.2 1.8 18	*2.1 2.5 17		
			7.3 4.5 20	6.4 3.5 18	*4.0 3.3 15	*2.8 2.9 16	7.5 17.5 11	-- -- --	*.8 1.3 6	-- -- --
Medium Level Winter	8.6 4.1 27	7.4 4.4 33	7.1 5.0 31	5.1 4.4 26	6.2 3.9 20	6.0 3.4 21	3.4 3.1 17	3.8 4.0 12		
			6.2 3.9 28	6.9 3.8 28	5.3 3.4 26	5.3 9.1 28	4.6 3.0 19	3.9 3.4 17		
Medium Level Summer	9.8 5.7 30	9.8 5.3 29	7.3 4.7 27	5.3 4.6 24	6.8 4.3 18	7.1 3.8 21	4.0 3.3 23	*2.8 3.6 20		
			7.9 4.9 11	8.9 4.5 11	7.1 4.8 10	5.8 3.6 9	6.0 3.8 16	4.7 4.1 15		
Low Level Winter	16.0 -- 2	15.1 2.7 8	14.6 4.2 7	11.3 4.6 7	15.7 23.0 10	7.4 3.2 10	5.4 3.1 10	4.7 3.0 9		
			10.1 4.1 9	11.1 3.4 11	12.4 3.5 10	9.6 4.2 11	5.6 2.1 5	2.0 .8 4	3.0 1.4 2	4.5 4.9 2
Low Level Summer	*15.3 1.2 3	*12.7 2.4 6	*13.2 6.0 5	15.0 4.1 4	22.0 28.5 6	6.8 1.5 5	6.0 4.9 4	3.3 2.5 4		
			12.8 3.8 5	*9.0 3.5 6	*10.2 5.4 5	*8.2 6.8 5	*3.5 4.9 2	-- 0 --	-- -- --	-- -- --

TABLE 68

QDR I
(CORRECT RESPONSES)

BOYS

Grade	5		6		7		8		9	
High Level Winter	4.3 2.1 21	-- -- --	5.1 2.7 17	6.1 1.7 17	4.6 2.8 10	-- -- --	6.2 2.5 9	6.7 1.8 10		
			6.1 2.1 19	-- -- --	6.5 2.3 13	6.3 2.1 19	6.2 2.4 23	-- -- --	7.1 1.0 10	-- -- --
High Level Summer	*4.9 2.6 15	-- -- --	*6.5 1.6 11	*7.3 1.4 12	*6.4 1.5 21	-- -- --	*7.0 1.0 19	*6.9 1.1 16		
			4.5 2.8 19	-- -- --	5.4 3.1 12	6.1 1.7 16	6.8 3.1 8	-- -- --	7.4 .9 5	-- -- --
Medium Level Winter	4.0 2.6 29	-- -- --	4.5 2.9 32	5.6 2.6 24	4.8 1.9 18	-- -- --	5.6 2.5 16	6.0 1.4 13		
			4.9 2.4 30	-- -- --	5.8 2.3 24	6.5 1.5 15	4.9 2.5 18	-- -- --	-- -- --	-- -- --
Medium Level Summer	3.7 2.5 30	-- -- --	4.1 3.1 25	5.6 2.3 25	4.6 2.1 22	-- -- --	*6.0 1.8 23	*6.7 1.5 20		
			*4.9 2.9 10	-- -- --	4.6 2.3 9	*6.7 1.4 6	*6.0 3.8 16	4.7 4.1 15	-- -- --	
Low Level Winter	1.5 1.6 8	-- -- --	1.9 1.7 7	2.8 1.9 5	4.1 2.7 9	-- -- --	4.9 2.3 10	6.9 1.9 9		
			1.7 1.8 9	-- -- --	2.1 1.4 10	4.7 2.5 10	4.4 1.7 5	-- -- --	5.0 4.2 2	6.3 1.2 3
Low Level Summer	1.4 1.1 8	-- -- --	1.0 1.3 6	2.0 1.4 4	4.0 2.4 6	-- -- --	*5.4 2.9 5	*7.3 1.5 4		
			*3.8 3.0 4	-- -- --	1.6 1.7 5	3.0 3.2 4	*6.0 1.4 2	-- -- --	-- -- --	-- -- --

TABLE 69

QDR I
(STRUCTURAL ERRORS)

BOYS

Grade	5		6		7		8		9	
High Level Winter	3.5 2.0 21	-- -- --	2.9 2.7 17	1.8 1.7 17	3.4 2.8 10	-- -- --	1.8 2.5 9	1.3 1.8 10		
			1.6 1.5 19	-- -- --	1.5 2.3 13	1.4 1.7 18	1.8 2.4 23	-- -- --	.9 1.0 10	-- -- --
High Level Summer	*3.1 2.7 15	-- -- --	*1.5 1.6 11	* .8 1.4 12	*1.6 1.5 21	-- -- --	*1.0 1.0 19	*1.1 1.1 16		
			2.7 2.4 18	-- -- --	2.6 3.1 12	1.9 1.7 16	2.6 3.3 9	-- -- --	* .6 .9 5	-- -- --
Medium Level Winter	3.9 2.5 29	-- -- --	3.5 3.0 32	2.3 2.6 24	3.2 1.9 18	-- -- --	2.4 2.5 16	2.0 1.4 13		
			3.1 2.4 30	-- -- --	2.1 2.2 24	1.9 2.1 16	3.1 2.5 18	-- -- --	-- -- --	
Medium Level Summer	4.1 2.4 30	-- -- --	3.9 3.0 25	*2.3 2.3 24	3.4 2.1 22	-- -- --	*1.8 1.8 23	*1.3 1.5 20		
			3.2 2.9 10	-- -- --	3.4 2.3 9	*1.2 1.5 6	3.2 2.7 17	-- -- --	-- -- --	
Low Level Winter	6.5 1.6 8	-- -- --	6.1 1.7 7	5.2 1.9 5	4.1 2.7 8	-- -- --	3.1 2.3 10	1.1 1.9 9		
			6.3 1.8 4	-- -- --	5.8 1.5 10	3.1 2.1 10	3.4 1.7 5	-- -- --	3.0 4.2 2	1.7 1.2 3
Low Level Summer	6.4 1.2 8	-- -- --	7.2 1.3 6	5.8 1.7 4	4.2 2.6 5	-- -- --	*2.6 2.9 5	* .8 .5 4		
			*4.3 3.0 4	-- -- --	6.4 1.7 5	5.0 3.2 4	*2.0 1.4 2	-- -- --	-- -- --	-- -- --

TABLE 70

QDR II
(CORRECT RESPONSES)

BOYS

Grade	5		6		7		8		9	
High Level Winter	3.1 1.9 21	3.3 1.9 21	3.8 1.7 17	3.1 2.0 17	4.8 1.5 10	3.3 1.2 8	5.0 1.4 9	4.5 1.9 10		
			3.2 1.3 19	4.3 1.9 18	4.6 2.0 13	5.4 1.9 19	4.6 2.1 23	-- -- --	6.0 2.0 10	-- -- --
High Level Summer	3.4 2.0 14	*3.4 1.3 14	3.2 2.7 11	*4.0 1.8 11	4.2 1.7 21	*4.6 2.1 17	*5.2 2.2 19	*5.4 1.2 16		
			*3.7 1.9 19	3.0 1.4 19	2.9 2.1 11	4.4 2.1 15	4.4 2.2 8	-- -- --	5.8 2.8 5	-- -- --
Medium Level Winter	2.7 1.4 29	3.5 1.4 33	3.6 1.6 31	3.4 1.5 24	3.8 1.9 18	3.7 1.6 21	3.6 1.7 17	3.8 1.3 13		
			3.1 1.5 30	3.7 1.5 28	3.7 1.7 24	3.5 1.6 15	4.6 1.7 18	4.4 1.7 17	-- -- --	
Medium Level Summer	*3.4 1.3 30	3.1 1.5 29	3.0 1.7 25	3.0 2.0 25	3.7 1.9 22	3.3 1.3 20	*4.0 1.7 23	*4.5 1.9 20		
			3.0 1.7 9	2.7 .9 10	2.8 2.0 9	3.0 1.8 6	4.2 1.5 17	*4.6 2.2 14	-- --	
Low Level Winter	2.6 .7 8	2.3 1.2 8	3.0 1.2 7	2.7 1.5 5	3.4 1.6 9	2.7 1.3 9	3.4 1.3 10	3.1 1.8 9		
			2.0 1.7 9	2.5 1.4 11	2.0 1.3 10	3.8 1.9 10	2.2 1.6 5	3.3 .5 4	2.5 2.1 2	2.3 1.2 3
Low Level Summer	2.1 .8 8	*2.8 1.5 6	2.5 1.2 6	.5 .6 4	3.0 1.4 6	2.6 1.1 5	1.8 .4 5	2.5 1.0 4		
			*2.3 1.0 4	*2.6 1.3 5	1.4 1.7 5	*3.8 1.3 4	*3.0 2.8 2	-- 0 --	-- -- --	-- -- --

TABLE 71

QDR II
(DIRECTIONAL ERRORS)

BOYS

Grade	5		6		7		8		9	
High Level Winter	3.3 1.6 21	3.1 1.3 21	2.9 1.7 17	4.1 2.0 17	2.5 1.4 10	3.3 1.6 8	1.8 .8 9	3.2 1.8 10		
			3.4 1.3 19	2.2 1.5 18	2.2 1.4 13	1.8 1.2 19	2.7 1.6 23	-- -- --	1.7 1.7 10	-- -- --
High Level Summer	2.9 1.6 14	3.0 1.3 14	3.1 1.9 11	3.4 1.7 11	2.9 1.3 21	2.1 1.7 17	2.3 1.9 19	2.4 1.1 16		
			2.9 1.9 19	2.6 1.3 19	2.7 1.9 11	2.5 1.5 15	3.0 1.6 9	-- -- --	2.0 2.3 5	-- -- --
Medium Level Winter	2.8 1.5 29	2.8 1.4 33	3.2 1.7 31	3.4 1.5 24	3.3 1.2 18	3.2 1.4 21	3.4 1.3 17	3.5 1.6 13		
			3.5 1.4 30	2.8 1.3 28	3.0 1.5 24	3.8 1.8 16	2.6 1.5 18	2.6 1.4 17	-- -- --	
Medium Level Summer	2.6 1.4 30	3.0 1.4 29	3.3 1.8 25	3.7 1.9 25	2.8 1.3 22	3.2 1.2 20	3.1 1.7 23	2.9 1.4 20		
			2.9 1.9 9	3.4 .8 10	3.4 1.5 9	2.3 1.0 6	2.8 1.4 17	2.0 1.4 14	-- -- --	-- -- --
Low Level Winter	3.3 1.7 8	3.0 1.6 8	2.9 .9 7	3.0 2.3 5	3.2 1.6 9	2.9 1.4 9	2.5 .8 10	3.9 1.8 9		
			3.1 1.9 9	2.2 1.5 11	2.2 1.5 10	3.0 1.6 10	4.0 1.9 5	4.0 .8 4	4.0 2.8 2	5.3 .6 3
Low Level Summer	2.8 1.2 8	2.7 .8 6	2.7 1.0 6	4.0 1.8 4	3.7 1.8 6	3.4 1.1 5	3.6 1.9 5	4.5 .6 4		
			3.8 .5 --	2.6 1.5 5	3.6 1.8 5	3.0 .8 4	3.0 2.8 2	-- 0 --	-- -- --	-- -- --

TABLE 72

QDR II
(STRUCTURAL ERRORS)

BOYS

Grade	5		6		7		8		9	
High Level Winter	1.3 1.2 21	1.3 1.2 21	1.4 1.3 17	.8 .9 17	.7 .7 10	1.0 .8 8	1.2 1.1 9	.2 .4 10		
			1.7 2.1 19	1.3 1.3 18	1.2 1.0 13	.6 1.3 18	.7 1.3 23	-- -- --	.3 .5 10	-- -- --
High Level Summer	1.6 1.9 14	1.4 1.6 14	1.5 1.7 11	* .5 1.0 11	.8 .9 21	*1.0 1.0 17	* .5 .6 19	.3 .6 16		
			*1.1 1.3 18	1.7 1.2 19	2.0 1.5 11	1.0 1.4 15	1.0 1.0 4	-- -- --	-- -- --	-- -- --
Medium Level Winter	2.0 1.6 29	1.6 1.3 33	1.2 1.1 31	1.2 1.3 24	.9 1.3 18	1.1 1.0 21	.9 1.1 17	.7 .9 13		
			1.2 1.0 30	1.3 1.2 28	1.3 1.5 24	.9 1.0 16	.7 .8 18	.1 .9 17	-- -- --	-- -- --
Medium Level Summer	*1.3 1.4 30	1.8 1.1 29	1.7 1.5 25	*1.1 1.8 24	1.4 1.3 22	1.4 1.1 20	* .9 .9 23	* .7 .9 20		
			1.6 2.1 9	1.9 1.0 10	1.6 1.3 9	1.7 .5 6	.8 1.4 17	1.1 1.1 14	-- -- --	-- -- --
Low Level Winter	2.0 1.1 8	2.3 1.3 8	2.0 1.6 7	3.2 1.9 5	.8 1.4 8	2.4 1.5 9	2.1 1.1 10	1.0 1.7 9		
			2.9 1.7 9	2.8 1.3 11	2.9 1.7 10	1.2 1.0 10	1.8 .8 5	4.5 .5 4	1.5 .7 2	.3 .6 3
Low Level Summer	3.1 .8 8	2.5 1.5 6	*2.0 1.3 6	*2.8 2.1 4	* .8 .8 5	*2.0 1.4 5	2.6 1.8 5	*1.0 .8 4		
			*2.0 .8 4	*2.8 1.3 5	*2.0 1.7 5	1.3 1.9 4	2.0 -- 2	-- -- --	-- -- --	-- -- --

TABLE 73

MILTA-VOCABULARY

BOYS

Grade	5	5	6	6	7	7	8	8	9	9
High Level Winter	15.9 5.0 24	17.5 6.0 23	14.4 5.9 16	11.9 5.9 18	15.1 4.8 11	17.2 3.1 10	15.0 2.7 9	13.6 3.3 7		
			16.7 5.7 17	17.6 4.7 17	14.8 4.3 19	17.9 14.3 17	16.3 3.7 22	19.3 3.3 22	16.2 3.8 10	16.3 4.7 10
High Level Summer	15.4 3.7 15	16.9 4.3 15	15.3 4.6 11	16.3 4.0 12	14.2 4.2 18	16.7 2.9 16	16.1 3.8 19	13.8 4.1 19		
			*21.2 4.6 20	18.8 3.6 19	15.4 5.2 16	17.2 4.4 17	15.4 4.5 12	16.8 3.1 13	12.5 1.4 [illegible]	11.8 1.7 4
Medium Level Winter	14.0 4.8 30	15.6 6.0 31	11.7 4.4 30	13.1 5.0 30	12.3 4.7 19	15.1 4.8 21	10.4 3.9 16	12.8 4.1 17		
			16.7 4.6 30	18.3 5.1 26	13.9 5.1 22	15.2 5.4 25	15.2 4.1 18	16.2 5.1 17	-- -- --	-- -- --
Medium Level Summer	12.2 5.8 29	14.3 4.7 29	12.3 5.2 26	12.6 4.7 27	11.2 3.4 22	13.9 3.9 19	10.9 4.0 21	12.3 3.8 23		
			15.4 3.6 11	14.9 3.8 9	12.8 4.8 11	13.5 5.2 11	14.0 4.5 15	14.9 3.8 14	-- -- --	-- -- --
Low Level Winter	8.3 3.1 8	9.4 3.3 8	6.1 1.2 7	7.0 4.0 7	8.7 1.4 6	15.2 18.9 9	6.0 3.5 9	5.8 4.4 9		
			8.1 4.7 9	9.0 5.2 10	6.8 4.1 11	8.0 4.3 11	12.8 1.9 5	11.8 2.2 4	-- -- --	8.3 .6 3
Low Level Summer	5.4 3.6 8	8.6 4.1 7	4.0 2.1 6	7.0 4.7 4	6.0 2.4 5	9.6 3.2 5	9.0 1.6 4	9.5 2.1 4		
			8.0 5.0 5	9.0 5.4 6	5.3 4.0 4	8.0 4.7 5	10.5 3.5 2	7.0 10.0 2	-- -- --	-- -- --

TABLE 74

MILTA-SENTENCE COMPLETION

BOYS

Grade	5		6		7		8		9	
High Level Winter	8.0 3.7 24	10.0 2.7 23	10.2 3.8 16	11.3 3.0 18	12.1 2.4 11	12.8 1.5 10	11.7 2.4 9	12.1 2.7 7		
			11.3 3.3 17	11.6 2.9 17	10.5 2.9 19	12.7 8.2 17	13.0 3.1 22	13.0 3.0 22	13.1 1.4 10	13.4 1.6 10
High Level Summer	*9.1 2.1 16	9.3 2.5 15	*11.4 3.1 11	*11.5 2.0 12	12.0 1.2 18	11.3 3.8 16	*13.4 1.9 19	*12.6 1.7 19		
			9.8 4.7 20	*12.4 3.4 19	*11.0 3.4 16	11.9 2.9 17	11.6 4.1 12	12.3 3.0 13	12.8 1.2 6	*14.0 0 4
Medium Level Winter	7.7 3.0 30	8.5 3.0 31	8.7 3.1 30	10.1 3.3 30	8.9 3.7 19	11.0 3.2 21	9.2 3.8 16	9.9 3.3 17		
			9.6 2.3 30	11.0 1.9 26	10.0 2.6 22	11.0 3.8 25	10.4 3.3 18	11.8 3.0 17	-- -- --	-- -- --
Medium Level Summer	6.4 2.6 29	8.1 2.5 29	7.4 3.0 26	8.6 3.5 27	8.3 3.3 22	9.9 3.1 19	*9.2 3.3 21	9.2 3.0 22		
			8.2 2.3 11	9.3 3.7 9	8.1 3.4 11	8.6 4.1 11	10.4 3.1 15	11.5 2.6 14	-- -- --	-- -- --
Low Level Winter	3.4 2.1 8	5.1 2.2 8	3.4 1.9 7	3.9 2.7 7	5.3 2.2 6	6.7 3.0 9	4.9 3.2 9	5.0 2.9 9		
			5.1 3.5 9	4.9 3.1 10	5.6 2.9 11	5.4 2.5 11	8.8 2.5 5	11.3 1.3 4	-- -- --	8.0 2.6 3
Low Level Summer	*3.9 2.1 8	5.0 2.5 7	2.2 1.5 6	3.3 1.9 4	4.2 3.8 5	*7.4 3.5 5	*5.8 2.5 4	*6.8 2.1 4		
			4.6 1.1 5	*7.0 3.9 6	4.0 4.3 4	5.2 3.7 5	*10.5 .7 2	5.5 6.4 2	-- -- --	-- -- --

TABLE 75

MILTA ANALOGIES

BOYS

Grade	5		6		7		8		9	
High Level Winter	-- -- --	-- -- --	-- -- --	-- -- --	10.8 3.1 11	13.1 2.2 10	11.9 3.5 9	12.3 3.5 7		
			-- -- --	-- -- --	8.8 4.9 10	8.8 4.5 12	11.6 4.3 22	12.0 3.7 22	12.7 2.4 10	14.5 2.2 10
High Level Summer	-- -- --	-- -- --	-- -- --	-- -- --	*11.5 3.5 18	11.1 4.7 16	*12.1 3.1 19	12.0 3.0 19		
			-- -- --	-- -- --	8.6 3.3 12	*9.5 5.4 11	*16.3 14.6 12	*12.3 2.3 13	13.2 1.6 6	12.5 2.6 4
Medium Level Winter	-- -- --	-- -- --	-- -- --	-- -- --	7.6 4.0 21	9.9 4.4 20	8.3 3.3 12	10.5 4.3 17		
			-- -- --	-- -- --	7.5 3.6 15	10.4 3.9 17	10.6 4.1 18	11.8 2.6 17	-- -- --	-- -- --
Medium Level Summer	-- -- --	-- -- --	-- -- --	-- -- --	5.1 3.3 22	9.3 4.4 19	7.5 3.7 13	9.4 3.7 22		
			-- -- --	-- -- --	7.2 3.0 6	9.0 4.5 7	9.4 4.3 15	9.9 3.1 14	-- -- --	-- -- --
Low Level Winter	-- -- --	-- -- --	-- -- --	-- -- --	4.0 3.7 6	6.0 3.0 9	6.7 3.6 9	6.6 3.3 9		
			-- -- --	-- -- --	-- -- --	3.9 2.2 8	7.6 2.4 4	10 3.7 4	-- -- --	-- -- --
Low Level Summer	-- -- --	-- -- --	-- -- --	-- -- --	2.2 .8 5	5.8 3.9 5	5.8 4.2 4	*8.0 4.1 4		
			-- -- --	-- -- --	-- -- --	*7.0 3.6 3	4.0 1.4 2	5.0 4.2 2	-- -- --	-- -- --

TABLE 76

MILTA-CONCEPTS

BOYS

Grade	5		6		7		8		9	
High Level Winter	7.0 3.0 24	8.0 3.1 23	5.8 3.3 16	5.4 3.5 18	7.1 3.6 11	7.4 3.0 10	8.0 2.4 9	7.3 3.0 7		
			8.06 2.6 17	13.5 17.9 16	6.3 2.8 19	11.4 20.6 17	8.5 3.6 22	9.3 3.0 22	9.4 3.6 10	8.0 3.7 10
High Level Summer	*8.1 2.7 15	*8.2 2.3 15	5.7 2.5 11	*6.3 2.9 12	*7.1 2.6 18	*7.7 2.2 16	*8.6 3.3 19	*7.9 3.0 19		
			*10.9 14.5 20	8.5 3.2 19	*6.3 3.0 16	7.4 2.9 16	8.0 1.9 11	9.0 2.6 13	7.5 3.6 6	7.3 1.0 4
Medium Level Winter	5.8 2.5 30	6.5 2.8 31	4.8 2.5 30	5.2 2.5 30	5.9 2.9 21	7.0 3.9 21	5.7 2.0 16	6.3 4.1 17		
			8.4 2.7 30	9.0 3.5 26	6.0 2.8 22	5.8 2.8 25	7.2 3.2 18	6.7 3.6 17	-- -- --	-- -- --
Medium Level Summer	5.6 2.8 29	5.9 4.3 29	4.6 2.8 26	5.0 3.1 27	5.4 2.6 22	4.8 2.7 19	5.4 2.8 21	6.0 2.3 22		
			6.5 3.1 11	8.8 2.5 9	5.8 2.6 11	5.1 2.0 11	*9.4 4.3 15	*9.9 3.1 14	-- -- --	-- -- --
Low Level Winter	3.9 1.7 8	4.6 1.9 8	2.1 1.5 7	2.4 2.0 7	4.8 2.6 6	4.0 2.5 9	2.2 2.0 9	3.3 2.3 9		
			3.4 2.8 9	5.3 3.3 10	2.5 1.9 8	2.8 1.5 11	5.6 1.7 5	4.3 2.1 4	-- -- --	6.3 1.2 3
Low Level Summer	2.4 1.2 8	4.4 2.7 7	1.3 1.2 6	*2.5 1.9 4	2.8 2.0 5	3.4 1.8 5	3.8 1.7 4	5.0 1.8 4		
			2.4 1.5 5	3.3 2.3 6	*3.0 2.8 2	1.6 1.1 5	5.5 .7 2	4.0 5.7 2	-- -- --	-- -- --

TABLE 77

RAVEN
(CORRECT RESPONSES)

BOYS

Grade	5		6		7		8		9	
High Level Winter	28.6 8.1 21	-- -- --	33.6 7.2 15	-- -- --	32.3 14.3 10	-- -- --	41.1 7.3 10	-- -- --		
			36.0 7.0 19	-- -- --	37.3 8.0 17	-- -- --	35.4 8.2 23	-- -- --	-- -- --	-- -- --
High Level Summer	*32.2 6.8 15	-- -- --	*36.5 4.8 11	-- -- --	*35.4 8.8 21	-- -- --	*42.6 7.2 18	-- -- --		
			32.5 14.6 19	-- -- --	34.9 10.9 17	-- -- --	35.1 10.3 8	-- -- --	-- -- --	-- -- --
Medium Level Winter	22.2 7.2 32	-- -- --	30.1 7.1 32	-- -- --	33.7 8.0 20	-- -- --	36.4 7.0 17	-- -- --		
			32.3 8.2 31	-- -- --	36.4 6.3 26	-- -- --	37.3 9.2 18	-- -- --	-- -- --	-- -- --
Medium Level Summer	*22.5 9.6 30	-- -- --	29.6 8.7 27	-- -- --	31.2 8.4 21	-- -- --	36.0 6.1 23	-- -- --		
			27.9 8.1 12	-- -- --	32.9 5.7 10	-- -- --	34.2 8.5 18	-- -- --	-- -- --	-- -- --
Low Level Winter	20.0 6.2 8	-- -- --	23.3 7.0 8	-- -- --	28.0 13.1 6	-- -- --	30.9 13.7 10	-- -- --		
			22.9 8.0 8	-- -- --	26.7 8.4 11	-- -- --	35.4 3.8 5	-- -- --	-- -- --	-- -- --
Low Level Summer	20.9 7.9 8	-- -- --	21.4 6.3 5	-- -- --	18.4 5.6 5	-- -- --	*34.8 6.2 4	-- -- --		
			*23.5 8.1 4	-- -- --	23.6 10.3 5	-- -- --	32.0 7.1 2	-- -- --	-- -- --	-- -- --

TABLE 78

RAVEN
(STRUCTURAL ERRORS)

BOYS

Grade	5		6		7		8		9	
High Level Winter	21.3 12.9 21	-- -- --	20.7 12.0 15	-- -- --	17.0 13.7 10	-- -- --	13.7 10.4 10	-- -- --		
			15.3 11.1 19	-- -- --	19.1 10.1 17	-- -- --	9.6 10.3 23	-- -- --	-- -- --	-- -- --
High Level Summer	*19.5 12.1 15	-- -- --	*13.3 8.3 11	-- -- --	*16.0 11.2 21	-- -- --	*12.1 4.3 18	-- -- --		
			21.1 11.3 19	-- -- --	*16.0 73.8 17	-- -- --	*9.6 14.2 9	-- -- --	-- -- --	-- -- --
Medium Level Winter	15.9 12.2 32	-- -- --	15.6 10.1 32	-- -- --	18.4 16.5 20	-- -- --	17.1 10.8 17	-- -- --		
			14.8 8.5 31	-- -- --	15.7 10.1 26	-- -- --	15.2 10.9 18	-- -- --	-- -- --	-- -- --
Medium Level Summer	19.8 13.6 30	-- -- --	18.3 12.5 27	-- -- --	*15.4 11.7 21	-- -- --	*12.9 7.7 23	-- -- --		
			15.8 12.4 12	-- -- --	19.8 11.1 10	-- -- --	15.9 11.0 18	-- -- --	-- -- --	-- -- --
Low Level Winter	30.5 11.0 8	-- -- --	26.4 14.1 8	-- -- --	16.7 15.8 6	-- -- --	14.4 13.1 10	-- -- --		
			16.3 10.7 8	-- -- --	18.9 10.9 11	-- -- --	8.8 4.3 5	-- -- --	-- -- --	-- -- --
Low Level Summer	*30.5 10.1 8	-- -- --	28.6 7.9 5	-- -- --	33.2 15.1 5	-- -- --	*13.8 9.3 4	-- -- --		
			20.3 8.7 4	-- -- --	29.0 13.1 5	-- -- --	18.0 8.5 2	-- -- --	-- -- --	-- -- --

TABLE 79

G.S.A.T.
(CORRECT RESPONSES)

BOYS

Grade	5		6		7		8		9	
High Level Winter	14.7 6.5 21	-- -- --	19.2 8.9 18	-- -- --	19.6 6.5 11	-- -- --	24.3 5.4 9	-- -- --		
			16.1 5.5 17	-- -- --	18.6 5.4 11	-- -- --	20.1 5.0 20	25.5 7.0 17	-- -- --	-- -- --
High Level Summer	*14.9 6.8 13	-- -- --	*23.0 4.6 11	-- -- --	17.2 7.8 20	-- -- --	*25.1 6.1 19	-- -- --		
			13.7 5.6 17	-- -- --	*19.6 6.0 11	-- -- --	*23.8 3.6 9	*27.7 3.6 11	-- -- --	-- -- --
Medium Level Winter	13.6 4.9 31	-- -- --	19.3 5.3 32	-- -- --	15.5 5.6 22	-- -- --	20.8 5.5 16	-- -- --		
			16.1 6.5 25	-- -- --	22.3 5.5 15	-- -- --	19.1 5.7 13	-- -- --	-- -- --	-- -- --
Medium Level Summer	13.2 7.1 29	-- -- --	18.6 6.7 26	-- -- --	15.4 5.9 22	-- -- --	*21.3 6.0 23	-- -- --		
			14.4 6.0 12	-- -- --	21.7 2.8 6	-- -- --	18.2 6.2 18	-- -- --	-- -- --	-- -- --
Low Level Winter	11.0 3.4 8	-- -- --	15.7 4.6 6	-- -- --	16.8 5.8 6	-- -- --	18.5 4.4 8	-- -- --		
			13.0 5.7 10	-- -- --	17.6 5.3 10	-- -- --	17.6 1.7 5	-- -- --	-- -- --	-- -- --
Low Level Summer	11.1 3.1 8	-- -- --	12.7 6.6 6	-- -- --	9.6 7.3 5	-- -- --	21.2 5.7 4	-- -- --		
			*14.8 5.4 5	-- -- --	14.6 6.1 5	-- -- --	17.0 4.2 2	-- -- --	-- -- --	-- -- --

TABLE 80

NUMERICAL ANALOGIES
(CORRECT RESPONSES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	11.7 7.1 18	20.8 6.2 19	23.9 7.1 14	27.2 7.2 13	19.3 5.7 16	27.5 7.3 16	26.8 7.2 16	31.7 4.6 13		
			18.7 6.3 15	22.1 6.9 15	22.7 7.4 14	28.7 8.0 15	25.6 6.5 13	-- -- --	33.9 2.0 7	-- -- --
High Level Summer	*12.1 5.0 17	*20.9 7.9 16	*21.6 7.4 16	28.5 6.5 16	17.8 5.6 14	24.1 8.0 16	*26.9 6.7 15	28.8 6.0 14		
			16.8 4.7 22	19.6 5.5 21	*23.1 4.8 20	26.6 4.0 19	25.3 5.7 19	-- -- --	32.0 4.6 12	-- -- --
Medium Level Winter	12.4 16.2 25	17.3 6.2 27	20.3 5.8 23	20.9 6.8 28	17.4 7.3 19	21.1 8.2 19	22.3 7.5 21	25.8 7.9 20		
			14.0 5.6 22	18.6 6.8 20	18.6 7.8 20	22.5 5.3 19	20.7 5.8 19	23.2 5.4 22		
Medium Level Summer	*15.6 14.0 18	15.8 4.9 20	17.7 5.3 20	19.9 5.6 21	*18.2 6.1 21	19.7 7.7 19	*23.9 5.6 20	*26.0 6.4 20		
			13.7 4.6 25	16.2 7.2 28	*21.6 6.1 25	*22.5 7.3 22	18.8 6.2 16	19.2 6.8 20		
Low Level Winter	5.5 5.0 13	8.8 5.8 12	11.8 6.6 8	14.4 6.5 7	8.9 6.2 10	13.7 8.8 11	13.0 6.7 9	14.3 8.6 7		
			8.8 7.0 4	10.6 4.2 5	11.5 9.0 4	12.8 5.4 5	12.9 6.7 8	13.8 8.2 8	16.5 3.3 4	17.8 3.4 4
Low Level Summer	*7.8 6.0 14	8.7 6.1 16	*14.1 7.7 13	*15.8 6.4 13	6.6 6.4 9	9.4 4.8 9	8.7 2.7 6	9.9 5.0 8		
			*11.2 6.4 6	*12.3 8.7 7	*13.3 5.0 8	*15.2 4.4 6	*18.3 11.5 4	*19.0 8.0 4	+20.7 6.4 3	+19.0 8.5 2

TABLE 81

NUMERICAL ANALOGIES
(ERRORS)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	5.8 9.1 18	4.6 5.7 19	4.6 7.0 14	1.2 2.0 13	8.4 8.7 16	4.5 7.6 16	5.4 7.7 16	1.9 4.1 13		
			4.3 4.3 15	5.6 5.6 15	7.5 7.8 14	5.3 7.6 15	4.6 5.5 13	-- -- --	2.1 2.0 7	-- -- --
High Level Summer	5.7 7.7 17	5.6 8.7 16	6.0 6.3 16	.7 1.2 16	7.3 9.1 14	4.6 4.5 16	5.3 6.5 15	2.5 2.2 14		
			4.3 4.4 22	3.7 3.3 21	3.1 2.3 20	3.9 3.5 19	3.7 3.4 19	-- -- --	1.9 2.6 12	-- -- --
Medium Level Winter	4.0 6.6 25	3.0 3.7 27	5.3 5.4 23	4.5 6.4 28	3.7 5.3 19	6.4 8.1 19	4.7 5.7 21	6.2 8.2 20		
			2.1 2.2 22	5.5 8.4 20	8.3 7.5 20	2.4 4.1 19	3.8 4.6 19	4.7 3.9 22		
Medium Level Summer	7.1 9.5 17	4.7 8.5 20	7.5 8.8 20	6.2 7.5 21	2.9 2.8 21	5.9 6.5 19	3.5 3.6 20	5.0 5.8 20		
			3.0 4.2 25	6.3 8.7 28	5.6 7.2 25	3.4 5.6 22	7.1 7.3 16	7.5 9.1 20		
Low Level Winter	9.2 10.7 13	13.7 11.8 12	7.1 7.8 8	5.9 8.2 7	9.5 8.0 10	6.9 8.9 11	10.0 11.2 9	11.4 9.2 7		
			7.0 6.5 4	7.4 12.3 5	6.3 9.8 4	3.4 4.9 5	12.5 13.1 8	12.4 12.4 8	7.8 7.5 4	6.5 5.3 4
Low Level Summer	4.7 6.0 14	9.8 8.9 16	8.8 6.2 13	5.3 6.1 13	10.0 13.9 9	3.8 3.9 9	5.8 3.3 6	10.9 11.6 8		
			7.5 6.8 6	10.9 12.8 7	10.0 10.8 8	5.5 6.7 6	5.5 11.3 4	7.3 4.9 3	1.7 1.5 3	4.0 2.8 2

TABLE 82

VERBAL ANALOGIES I
(CORRECT RESPONSES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	13.8 5.5 17		20.3 3.4 12	21.3 3.4 12	19.8 4.5 15		21.7 2.8 17	23.0 3.3 15		
			15.7 6.4 14		17.4 3.6 13	23.0 5.0 11	22.4 3.3 14			
High Level Summer	13.2 4.6 16		17.9 4.1 16	19.6 4.6 14	17.7 6.2 14		*22.8 2.0 14	*24.5 2.3 13		
			*15.9 4.6 21		*19.5 3.1 21	21.5 3.8 17	20.7 3.2 19			
Medium Level Winter	11.9 4.1 28		16.2 4.5 26	16.6 3.7 24	17.5 5.6 21		19.7 4.7 20	22.3 4.4 20		
			13.1 5.2 20		17.8 4.2 20	18.9 4.8 20	18.6 5.6 14			
Medium Level Summer	10.4 2.9 21		*17.3 3.1 19	*17.3 4.6 20	16.7 5.2 20		*19.9 3.8 16	21.0 4.8 19		
			*13.1 4.8 29		*18.1 4.4 22	*19.7 5.9 25	15.2 5.2 12			
Low Level Winter					8.8 5.0 11		14.4 7.0 11	17.5 10.3 8		
			5.0 1.2 4		7.0 4.2 5	8.4 3.4 5	12.9 6.8 7		12.8 3.3 4	12.8 2.6 4
Low Level Summer	5.4 3.8 8		10.2 6.0 13	10.0 5.0 13	7.4 4.9 8		10.0 4.7 8	13.6 5.6 8		
			*8.5 5.5 8		*10.3 7.7 8	*13.3 5.8 6				

TABLE 83

VERBAL ANALOGIES I
(DIRECTIONAL ERRORS)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	3.9 2.6 17		2.3 1.8 12	2.3 1.8 12	1.9 1.3 15		1.0 1.5 17	1.5 1.3 15		
			3.5 1.9 14		3.8 2.0 13	1.4 1.3 11				
High Level Summer	4.4 2.2 16		3.1 1.7 16	2.9 2.5 14	3.0 2.4 14		1.1 1.3 14	3.8 10.9 13		
			4.5 2.8 21		2.7 2.1 21	2.5 1.9 17				
Medium Level Winter	3.7 2.1 28		2.8 1.5 26	3.6 2.1 24	2.5 2.2 21		2.0 1.5 20	1.4 1.5 20		
			7.3 13.5 20		2.8 1.6 20	3.5 4.2 20				
Medium Level Summer	3.7 2.2 21		6.2 13.3 19	3.0 2.0 20	2.2 1.4 20		1.9 1.7 16	2.0 1.9 19		
			3.3 2.0 29		3.0 1.8 21	4.5 13.7 25				
Low Level Winter					2.5 2.7 11		1.9 1.3 11	2.1 2.1 8		
			5.0 2.0 4		5.0 4.7 5	2.6 1.5 5	2.0 2.0 7		1.8 1.0 4	4.4 1.0 4
Low Level Summer	3.5 1.1 8		1.5 1.7 13	3.5 1.4 13	2.6 1.7 8		2.4 1.4 8	2.0 1.7 8		
			3.0 1.3 8		2.0 1.1 8	3.0 1.0 6				

TABLE 84

VERBAL ANALOGIES I
(STRUCTURAL ERRORS)

GIRLS

Grade	5	6		7		8		9	
High Level Winter	8.3 4.1 17	3.5 1.7 12	2.9 2.1 12	4.0 3.3 15		3.7 2.3 17	2.3 2.8 15		
		7.6 4.9 14		5.4 2.5 13	3.1 2.9 11				
High Level Summer	7.9 3.5 16	5.6 2.8 16	4.1 2.9 14	6.3 5.1 14		3.1 1.8 14	1.1 1.2 13		
		5.8 3.1 21		4.4 1.6 21	2.7 2.5 17				
Medium Level Winter	9.8 3.9 28	7.5 4.1 26	5.8 3.2 24	5.8 4.3 21		5.2 3.7 20	2.8 3.1 20		
		8.8 4.3 20		5.6 4.4 20	4.5 4.4 20				
Medium Level Summer	10.2 3.6 21	6.3 2.9 19	5.6 3.5 20	6.5 4.6 20		5.0 2.5 16	3.8 3.9 19		
		8.4 4.9 29		5.7 4.0 21	4.4 5.0 25				
Low Level Winter				12.8 4.8 11		9.2 5.9 11	7.0 4.6 8		
		12.8 4.6 4		11.6 6.6 5	13.0 5.8 5	10.1 4.7 7		12.5 3.7 4	9.8 3.5 4
Low Level Summer	18.0 3.7 8	11.8 5.3 13	12.1 6.3 13	10.0 6.3 8		10.3 7.9 8	9.1 5.1 8		
		14.3 5.3 8		12.6 6.8 8	10.2 5.6 6				

TABLE 85

VERBAL ANALOGIES
(CORRECTLY SOLVED SIMPLE ANALOGIES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	11.8 5.9 17	15.1 14.2 19	16.3 3.3 12	17.6 3.1 12	15.9 2.3 14	16.0 4.4 16	17.5 2.3 17	17.6 2.4 15		
			13.9 4.9 14	14.2 4.0 15	16.5 2.3 13	17.0 2.6 11	16.7 3.3 13	-- -- --	19.6 1.1 7	-- -- --
High Level Summer	9.9 5.4 16	12.7 3.7 16	14.7 4.4 16	15.9 4.1 13	15.4 3.3 15	*17.4 2.2 16	*17.8 2.3 15	*21.8 10.6 12		
			13.5 3.5 21	13.4 3.6 21	16.2 3.2 22	*17.0 2.3 18	*17.7 2.4 19	-- -- --	18.3 1.2 12	-- -- --
Medium Level Winter	10.2 3.8 28	11.4 4.5 27	12.1 3.9 26	13.0 3.5 24	14.0 3.6 21	13.5 4.5 19	14.7 3.9 19	17.4 3.4 20		
			11.7 4.6 22	11.3 5.5 20	13.1 4.0 20	15.3 3.3 19	15.0 3.6 23	16.1 2.9 22		
Medium Level Summer	*11.6 3.5 21	10.2 3.5 20	*13.6 2.4 19	*14.1 3.4 20	*14.6 3.4 20	*13.7 3.9 18	*15.8 3.4 16	16.8 3.3 19		
			11.4 4.9 31	*11.6 4.6 28	*13.8 5.2 23	14.5 4.6 27	14.0 4.4 15	13.2 4.5 20		
Low Level Winter	7.5 2.6 4	6.3 3.2 12	7.9 4.3 7	12.4 3.9 8	7.6 4.7 11	7.5 3.6 11	14.4 17.0 11	12.0 5.6 8		
			3.0 .8 4	6.0 2.3 5	1.3 3.0 4	8.4 2.9 5	11.1 4.6 7	9.1 4.9 8	11.0 5.7 4	12.0 3.2 4
Low Level Summer	4.5 2.6 8	5.9 3.5 15	6.2 5.1 13	9.8 3.4 13	*10.0 3.8 8	*7.6 2.9 9	9.8 4.3 9	12.1 5.6 9		
			*7.3 4.9 8	*7.1 3.1 7	*8.3 6.2 8	*9.3 2.9 6	*13.5 5.3 4	*13.3 4.6 4	*14.0 4.0 3	*14.5 .7 2

TABLE 86

VERBAL ANALOGIES II
(STRUCTURAL ERRORS)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	7.4 5.3 17	6.2 5.1 19	3.4 3.0 12	1.8 1.9 17	3.7 2.1 14	3.4 4.1 16	2.2 2.3 17	2.2 2.3 15		
			5.7 4.9 14	5.4 4.2 15	2.7 2.3 13	2.6 2.7 11	3.2 3.3 13	-- -- --	.1 .4 7	-- -- --
High Level Summer	9.4 5.5 16	6.6 3.8 16	4.9 4.0 16	2.9 3.1 13	4.4 3.2 15	*2.4 2.3 16	*1.9 2.2 15	5.2 14.1 12		
			*5.6 3.6 21	*4.7 3.1 21	3.0 2.9 22	2.7 2.4 18	*2.5 1.9 15	-- -- --	1.8 1.2 12	-- -- --
Medium Level Winter	9.7 3.6 27	6.9 4.3 27	7.1 3.8 26	7.0 3.6 24	5.2 3.5 21	4.5 2.9 19	4.4 4.0 19	2.9 3.1 20		
			7.4 4.4 22	7.5 5.7 21	6.2 4.3 20	4.4 3.4 19	4.8 3.6 23	3.7 2.8 22		
Medium Level Summer	*8.3 3.6 21	8.2 4.6 20	*5.9 2.3 19	*5.5 3.2 20	5.6 3.1 19	5.5 3.9 18	*3.6 3.5 16	3.1 3.3 19		
			7.5 4.6 31	*6.6 4.8 28	*5.9 5.0 23	*4.1 4.5 27	5.9 4.1 15	5.9 3.6 20		
Low Level Winter	12.3 2.4 4	12.3 5.2 12	10.9 5.5 7	6.4 3.9 8	11.1 3.8 11	11.1 4.3 11	9.0 4.7 11	7.3 4.6 8		
			9.8 7.4 4	8.2 5.8 5	13.8 3.0 4	11.6 2.9 5	8.3 4.4 7	9.9 5.2 8	6.3 4.5 4	7.8 3.3 4
Low Level Summer	15.5 2.6 8	13.3 4.4 15	12.3 5.5 13	8.5 4.2 13	*9.0 4.3 8	*10.4 4.8 9	*8.8 5.7 9	*7.3 5.5 9		
			10.5 5.4 8	10.4 5.7 7	*11.8 6.2 8	*8.3 4.1 6	*6.0 5.5 4	*5.5 4.0 4	*3.0 7.6 3	*5.0 1.4 2

TABLE 87

VERBAL ANALOGIES II
(CORRECTLY SOLVED TRIPLE ANALOGIES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	3.4 3.0 17	3.5 2.7 19	5.4 1.9 12	6.4 1.8 12	5.2 1.3 14	5.4 2.6 16	6.4 1.4 17	6.3 1.7 15		
			4.3 2.4 14	4.3 2.1 15	5.5 1.6 13	5.7 1.7 11	5.5 2.3 13	-- -- --	7.7 .8 7	-- -- --
High Level Summer	2.6 2.6 16	3.4 1.9 16	4.8 2.1 16	5.5 2.3 13	5.0 2.2 15	*5.8 1.8 16	*6.5 1.5 15	*6.3 2.2 12		
			4.0 1.8 21	4.0 1.9 21	5.5 1.8 22	*5.8 1.5 18	*6.4 1.5 19	-- -- --	6.6 .8 12	-- -- --
Medium Level Winter	2.3 2.0 28	2.7 2.3 27	3.3 1.9 26	3.3 2.0 24	3.9 2.1 21	4.6 2.5 19	4.7 2.2 19	6.1 2.3 20		
			3.0 2.1 22	3.1 2.6 20	3.9 1.8 20	4.8 2.2 19	4.8 2.4 23	5.4 1.8 22		
Medium Level	*2.9 1.9 21	2.2 1.8 20	*3.8 1.7 19	*4.2 1.6 20	*4.5 2.1 20	3.9 2.1 18	*5.4 2.3 16	5.7 1.9 19		
			3.1 2.3 31	3.1 2.2 28	4.1 2.1 23	*4.9 2.5 27	4.0 2.2 15	3.6 2.3 20		
Low Level Winter	1.3 1.0 4	.8 1.0 12	2.3 1.7 7	3.8 1.8 8	1.6 1.6 11	1.0 2.0 11	2.2 2.5 11	3.3 2.6 8		
			6.0 -- 4	.2 .4 5	1.3 1.3 4	1.0 1.2 5	2.9 2.5 7	1.8 2.3 8	2.8 3.0 4	3.5 1.9 4
Low Level Summer	.5 .8 8	.7 1.2 1.5	1.5 2.0 13	2.0 1.4 13	*2.3 1.5 8	*1.1 1.3 9	2.1 1.7 9	*3.3 2.3 9		
			1.5 1.9 8	*1.0 1.1 7	*2.1 2.7 8	*1.7 1.6 6	*4.3 3.0 4	*3.3 3.3 4	*4.7 2.1 3	*4.5 .7 2

TABLE 88

QDR I
(CORRECT RESPONSES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	4.8 2.4 18	-- -- --	5.7 2.6 14	5.9 2.0 14	6.0 1.7 14	-- -- --	6.9 1.8 16	6.1 2.0 9		
			5.7 2.4 13	-- -- --	5.4 2.9 9	6.4 1.8 10	6.4 2.0 11	-- -- --	7.8 .4 6	-- -- --
High Level Summer	3.7 2.3 18	-- -- --	5.4 2.6 14	*5.9 2.8 15	4.5 2.6 16	-- -- --	5.7 2.7 12	*7.3 .8 12		
			4.9 2.4 20	-- -- --	*6.6 2.3 14	*6.4 2.0 19	5.5 2.1 18	-- -- --	7.0 .7 12	-- -- --
Medium Level Winter	2.9 2.5 27	-- -- --	4.2 2.6 28	4.6 3.0 23	4.6 2.6 21	-- -- --	5.8 2.5 20	6.4 2.6 21		
			3.7 2.5 24	-- 0 --	4.8 2.3 20	5.7 2.2 12	5.0 2.3 23	-- -- --	-- -- --	
Medium Level Summer	*3.3 2.3 23	-- -- --	*4.3 2.8 20	*4.9 2.7 19	4.2 2.4 18	-- -- --	5.3 2.7 18	5.7 2.1 19		
			*4.2 3.0 26	-- -- --	*5.7 2.4 22	*6.1 2.4 18	4.6 2.5 18	-- -- --	-- -- --	
Low Level Winter	1.5 1.0 13	-- -- --	6.1 .9 9	2.5 1.0 4	2.3 2.2 12	-- -- --	2.7 2.4 11	5.6 2.7 8		
			1.0 1.2 5	-- -- --	1.0 .7 5	5.2 2.2 5	1.9 2.4 8	-- -- --	1.8 3.5 4	2.4 2.7 5
Low Level Summer	*1.7 1.8 16	-- -- --	1.2 1.9 13	*2.8 2.1 8	2.1 2.1 8	-- -- --	*3.3 2.7 9	5.4 1.8 9		
			*1.3 1.8 7	-- -- --	.9 1.1 8	4.0 2.9 6	*5.8 3.2 4	-- -- --	*7.0 1.0 3	*3.7 3.1 3

TABLE 89

QDR I
(STRUCTURAL ERRORS)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	3.1 2.2 18	-- -- --	2.1 2.4 14	2.1 2.0 14	1.9 1.8 14	-- -- --	1.1 1.8 16	1.8 2.1 9		
			2.3 .4 13	-- -- --	2.6 2.9 9	1.3 1.6 10	1.6 2.0 11	-- -- --	.2 .4 6	-- -- --
High Level Summer	4.2 2.2 18	-- -- --	2.6 2.6 14	2.1 2.8 15	3.4 2.7 16	-- -- --	2.3 2.7 12	.8 .8 11		
			3.1 2.4 20	-- -- --	*1.4 2.3 14	1.6 1.9 19	2.5 2.1 18	-- -- --	1.0 .7 12	-- -- --
Medium Level Winter	5.1 2.5 27	-- -- --	3.8 2.6 28	3.3 2.9 22	3.3 2.6 20	-- -- --	2.2 2.5 20	1.5 2.5 21		
			4.3 2.5 24	-- -- --	3.2 2.3 20	2.3 2.2 12	2.9 2.2 23	-- -- --	-- -- --	
Medium Level Summer	*4.7 2.3 23	-- -- --	*3.7 3.8 20	*2.9 2.6 19	3.7 2.3 18	-- -- --	2.7 2.7 18	2.3 2.1 19		
			*3.6 2.8 26	-- -- --	*2.1 2.4 22	*1.9 2.4 18	3.4 2.5 18	-- -- --	-- -- --	
Low Level Winter	6.3 1.0 13	-- -- --	6.9 .9 9	5.5 1.0 4	5.8 2.2 12	-- -- --	5.3 2.4 11	2.4 2.7 8		
			7.0 1.2 5	-- -- --	6.4 .9 5	2.8 2.2 5	6.1 2.4 8	-- -- --	6.3 3.5 4	5.6 2.7 5
Low Level Summer	*6.3 1.8 16	-- -- --	*6.8 1.9 13	*5.3 2.1 8	*5.6 2.0 8	-- -- --	*4.1 2.7 9	2.6 1.8 9		
			*6.7 1.8 7	-- -- --	7.1 1.1 8	4.0 2.9 6	*2.3 3.2 4	-- -- --	* .7 .6 3	*4.3 3.1 3

TABLE 90

QDR II
(CORRECT RESPONSES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	3.3 1.6 18	3.8 1.8 19	3.4 1.6 14	3.4 1.8 14	4.3 1.7 14	4.8 1.8 16	5.2 2.5 15	4.6 2.1 9		
			5.0 1.8 13	3.9 1.6 14	4.4 1.8 9	4.2 1.9 10	5.0 2.4 11	-- -- --	5.5 2.9 6	-- -- --
High Level Summer	2.9 1.3 18	3.0 1.4 16	3.3 1.4 14	*3.6 1.6 14	*4.5 1.6 16	*5.0 2.0 16	5.1 2.1 12	*5.8 1.2 11		
			4.3 1.7 20	4.0 1.5 21	*4.4 2.3 14	*4.5 1.8 19	*5.2 1.2 18	-- -- --	5.2 1.7 12	-- -- --
Medium Level Winter	2.7 1.5 28	3.5 1.8 26	2.8 1.5 28	3.4 1.8 23	3.[illegible] [illegible].8 20	4.4 2.4 19	4.5 2.5 18	4.6 2.7 21		
			3.6 1.3 24	3.1 1.9 21	3.4 1.3 19	3.8 1.7 12	4.1 1.1 23	3.7 1.7 21	-- -- --	
Medium Level Summer	2.6 1.5 23	3.1 1.2 20	*3.3 .9 20	*3.4 2.0 19	*3.4 1.6 19	*4.5 2.0 18	4.4 2.1 18	4.4 2.0 19		
			3.3 1.5 26	2.9 1.9 27	3.3 1.6 22	3.6 1.5 19	*4.3 1.5 19	*3.7 1.3 19	-- -- --	
Low Level Winter	1.8 1.2 12	1.8 1.3 12	2.8 1.2 8	2.5 1.0 4	2.3 1.6 12	2.4 1.6 10	2.7 1.3 11	3.5 2.0 8		
			1.6 1.1 5	2.6 .5 5	3.6 .9 5	4.0 1.9 5	3.5 2.2 8	3.5 1.4 8	3.5 2.6 4	2.2 1.1 5
Low Level Summer	1.5 1.2 16	*2.6 1.6 16	2.2 1.5 13	*2.6 1.2 8	1.9 1.4 8	*3.3 1.7 9	2.3 1.1 9	*3.6 1.6 9		
			*3.3 2.0 7	2.7 1.7 7	2.0 1.2 7	2.5 1.5 6	2.8 1.7 4	3.3 .5 4	*4.0 -- 3	*4.0 -- 3

TABLE 91

QDR II
(DIRECTIONAL ERRORS)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	3.2 1.3 18	2.4 1.5 19	3.6 1.5 14	3.6 1.8 14	2.8 1.6 14	2.3 1.6 16	2.1 2.3 15	2.7 1.6 9		
			2.0 1.1 13	2.9 1.4 14	2.1 1.4 9	3.0 1.5 10	2.5 2.3 11	-- -- --	.3 .5 6	-- -- --
High Level Summer	3.3 1.2 18	3.5 1.0 16	3.4 1.3 14	3.7 1.6 14	2.5 1.4 16	2.4 1.5 16	2.3 1.6 12	1.9 .9 11		
			2.6 1.4 20	2.7 1.5 21	2.5 1.7 14	2.4 1.1 19	2.5 1.2 18	-- -- --	2.7 1.6 12	-- -- --
Medium Level Winter	3.0 1.5 28	3.1 1.5 26	3.3 1.5 28	3.3 1.4 23	3.5 1.5 20	2.7 1.9 19	2.7 2.2 18	2.5 2.5 21		
			2.9 .7 24	3.0 1.5 21	3.2 1.6 19	2.9 1.2 12	2.8 1.2 23	3.0 1.6 21	-- -- --	
Medium Level Summer	3.3 1.2 23	3.3 1.4 20	3.3 1.2 20	3.0 1.8 19	2.9 1.4 19	2.5 1.5 18	2.7 1.8 18	2.6 1.6 19		
			2.8 1.6 26	3.5 1.3 27	3.4 1.5 22	3.6 1.3 19	2.5 1.2 19	3.3 1.4 19	-- -- --	-- -- --
Low Level Winter	2.8 1.4 12	3.8 .9 12	2.9 .8 8	3.3 1.7 4	2.8 1.4 12	2.8 1.1 10	2.9 1.6 11	2.6 1.3 8		
			3.6 1.3 5	2.6 1.1 5	2.6 1.5 5	3.0 1.6 5	3.1 1.6 8	2.3 1.6 8	3.0 1.6 4	3.2 1.5 5
Low Level Summer	2.9 1.3 16	3.1 1.1 16	3.1 1.5 13	3.0 1.9 8	2.9 1.9 8	2.2 1.6 9	3.6 1.7 9	2.9 1.3 9		
			2.0 1.6 7	2.4 1.5 7	3.0 1.3 7	4.3 .5 6	3.3 1.3 4	2.8 .5 4	2.7 .6 3	2.3 .6 3

TABLE 92

QDR II
(STRUCTURAL ERRORS)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	1.4 1.4 18	1.6 1.1 19	1.1 1.2 14	1.0 .9 14	.9 1.4 14	.8 1.0 16	.7 .7 15	.8 .0 9		
			1.5 .7 13	1.1 1.2 14	1.4 1.2 9	.8 1.0 10	.4 .7 11	-- -- --	.3 .5 6	-- -- --
High Level Summer	1.7 1.4 18	*1.4 1.3 16	*1.1 1.9 14	*.6 .8 14	1.0 1.2 16	*.5 .8 16	*.6 1.1 12	*.3 .5 11		
			*1.0 1.4 20	1.2 1.1 21	*1.1 1.2 14	1.0 1.5 19	*.3 .7 18	-- -- --	*.2 .6 12	-- -- --
Medium Level Winter	2.0 1.7 28	1.4 .9 26	1.5 1.5 28	1.0 1.5 22	.9 1.2 20	.9 1.0 19	.8 1.1 18	.7 1.0 21		
			1.5 1.5 24	1.7 1.7 20	1.2 1.1 19	1.3 1.1 12	1.0 .9 23	1.2 1.2 21	-- -- --	-- -- --
Medium Level Summer	*2.0 1.6 23	1.6 .9 20	*1.2 .8 20	1.6 2.0 19	1.6 .6 19	*.7 1.0 18	*.8 1.0 18	.9 .9 19		
			1.6 1.6 26	*1.5 1.4 27	*1.2 1.5 22	*.8 .9 19	1.2 .8 19	*.9 1.0 19	-- -- --	-- -- --
Low Level Winter	3.3 1.3 12	2.4 1.4 12	2.4 1.8 8	2.3 1.0 4	1.8 1.5 12	2.5 1.9 10	2.1 1.6 11	1.8 2.0 8		
			2.6 .9 5	2.4 .9 5	1.8 1.3 5	1.0 1.0 5	1.4 1.2 8	1.0 .9 8	1.3 1.0 4	2.0 1.6 5
Low Level Summer	*3.3 1.2 16	*2.0 .9 16	2.7 1.8 13	*2.0 1.9 7	*1.5 1.7 8	*2.3 1.7 9	*2.0 1.9 9	*1.3 1.4 9		
			2.7 .8 7	2.9 .9 7	3.0 1.8 7	1.2 1.6 6	*1.0 .8 4	*1.0 -- 4	*1.3 .6 3	*1.3 .6 3

TABLE 93

MILTA-VOCABULARY

GIRLS

Grade	5		6		7		8		9	
High Level Winter	12.7 6.3 17	16.9 4.8 18	16.9 4.8 18	13.1 3.4 14	13.9 4.9 16	14.8 3.5 17	13.2 4.8 16	12.1 3.5 15		
			16.5 3.7 13	18.1 3.3 14	14.2 2.8 15	15.1 3.2 15	14.8 3.3 12	15.6 3.9 13	11.1 2.5 7	14.4 3.4 7
High Level Summer	14.3 5.3 14	16.1 4.2 15	12.0 4.0 16	12.9 4.3 16	14.3 3.8 15	16.9 3.9 15	15.1 2.2 15	14.0 4.9 14		
			15.4 6.1 22	17.5 5.5 22	13.2 4.6 20	14.4 3.5 19	17.4 3.4 19	17.8 3.4 18	12.8 3.0 12	15.2 2.7 10
Medium Level Winter	11.5 4.9 24	13.6 5.0 29	9.1 4.2 23	11.5 5.0 29	11.1 3.4 20	11.8 6.1 19	11.2 5.3 21	11.9 5.6 20		
			11.7 5.7 19	13.9 4.4 22	11.1 4.9 19	12.3 5.0 19	13.5 4.4 22	15.7 3.5 22	-- -- --	-- -- --
Medium Level Summer	11.7 3.9 21	13.7 5.6 23	11.2 4.4 20	11.1 4.7 21	9.8 5.2 18	12.4 5.3 19	9.5 5.1 20	10.9 5.0 20		
			13.5 5.2 29	15.9 4.6 26	11.4 4.6 27	13.8 5.2 25	12.5 4.2 18	13.6 3.3 19	-- -- --	-- -- --
Low Level Winter	4.2 2.2 12	7.1 3.3 12	4.6 2.7 8	6.4 1.8 8	5.5 4.0 10	6.1 4.4 10	5.8 3.7 9	5.8 3.5 8		
			8.0 2.6 4	1.0 4.2 2	3.0 2.8 4	6.8 4.4 5	8.3 5.0 6	7.6 3.8 7	-- -- --	4.5 3.2 6
Low Level Summer	4.4 2.5 18	11.6 16.2 15	5.7 2.8 13	9.5 10.0 13	5.3 1.9 8	4.8 1.7 8	3.9 4.4 7	5.1 5.4 9		
			7.8 3.8 8	12.4 6.3 5	6.3 4.6 8	9.5 4.5 6	9.3 2.9 3	9.0 2.0 4	-- -- --	5.3 .6 3

TABLE 94

MILTA-SENTENCE COMPLETION

GIRLS

Grade	5		6		7		8		9	
High Level Winter	11.5 12.8 17	9.3 2.0 18	10.4 3.0 14	11.7 2.1 13	10.7 3.8 16	12.8 1.7 17	11.5 2.7 16	11.1 1.9 15		
			10.3 2.3 13	11.9 2.3 14	10.9 3.6 15	11.2 3.2 15	11.3 3.5 12	12.5 2.9 13	12.6 2.2 7	12.1 2.2 7
High Level Summer	7.8 2.7 14	9.4 2.6 15	10.0 2.7 16	10.4 2.9 16	11.8 2.2 15	12.1 2.3 15	12.7 2.0 15	12.5 .8 14		
			9.5 2.7 22	11.3 2.1 22	10.8 2.2 20	11.6 2.5 19	12.6 2.4 19	13.7 1.6 18	12.0 3.0 12	13.3 1.8 10
Medium Level Winter	6.8 2.9 24	7.4 2.4 29	7.3 3.2 23	8.2 3.4 29	9.0 3.6 20	8.8 3.6 19	9.0 3.4 21	9.7 4.0 20		
			7.7 3.5 19	8.3 2.6 22	8.9 2.7 19	9.8 3.5 19	11.0 2.1 22	11.3 3.0 22	-- -- --	-- -- --
Medium Level Summer	6.7 2.2 21	8.6 2.7 23	6.9 1.6 20	8.7 2.4 21	8.2 3.2 18	10.2 3.2 19	8.1 3.4 20	8.9 3.0 20		
			8.2 2.9 29	9.5 3.0 26	9.1 3.5 27	10.3 2.9 25	4.8 4.1 18	10.3 3.6 19	-- -- --	-- -- --
Low Level Winter	2.3 2.2 12	3.8 2.2 12	3.5 2.0 8	5.3 2.9 8	3.8 3.0 10	5.1 3.3 10	4.1 3.0 9	4.8 2.2 8		
			3.5 1.9 4	4.0 -- 2	1.8 1.7 4	5.6 1.9 5	7.7 3.7 6	7.1 4.9 7	-- -- 6	5.0 4.2
Low Level Summer	3.3 2.1 18	4.3 2.3 15	3.9 2.4 13	7.5 7.2 13	3.3 1.8 8	3.8 2.1 8	4.0 3.1 7	4.1 2.9 9		
			3.6 2.1 8	7.6 2.5 5	4.8 3.5 8	7.3 3.7 6	8.3 1.2 3	8.5 2.9 4	-- -- --	5.7 2.9 3

TABLE 95

MILTA-ANALOGIES

GIRLS

Grade	5		6		7		8		9	
High Level Winter	-- -- --	-- -- --	10.5 4.1 10	10.1 3.8 10	8.6 3.4 16	11.2 4.2 17	11.1 3.3 16	12.0 2.4 15		
			8.6 3.4 16	11.2 4.2 17	11.1 3.3 16	12.0 2.4 15	11.0 4.3 12	12.5 3.1 13	12.6 2.2 7	13.0 2.2 7
High Level Summer	-- -- --	-- -- --	-- -- --	0 0 0	*9.1 11.5 15	10.5 3.0 15	*12.2 2.7 15	*13.0 6.1 14		
			-- -- --	-- -- --	9.8 4.0 15	8.8 3.7 12	10.8 3.6 19	*12.6 3.0 18	*13.1 3.2 12	11.3 2.1 10
Medium Level Winter	-- -- --	-- -- --	-- -- --	-- -- 0	7.0 4.3 20	9.5 4.5 19	9.6 4.1 15	10.3 4.7 20		
			0 -- --	-- -- --	5.7 3.3 11	8.3 4.1 12	8.6 4.2 21	10.7 3.6 22	-- -- --	-- -- --
Medium Level Summer	-- -- --	-- -- --	-- -- --	-- -- --	6.3 3.9 19	*9.9 4.7 19	7.7 3.1 14	10.0 3.9 20		
			-- -- --	-- -- --	*7.5 4.5 20	*8.2 4.6 18	6.9 3.4 18	9.0 4.7 19	-- -- --	-- -- --
Low Level Winter	-- -- --	-- -- --	-- -- --	-- -- --	2.6 1.3 10	4.6 4.4 10	4.6 4.6 9	5.5 3.6 8		
			-- -- --	-- -- --	-- -- --	2.0 2.8 2	6.8 3.1 6	5.7 3.0 7	-- -- --	-- -- --
Low Level Summer	-- -- --	-- -- --	-- -- --	-- -- --	1.3 1.3 8	3.6 2.4 8	3.7 3.1 7	3.4 2.4 9		
			-- -- --	-- -- --	-- -- --	*4.8 .5 4	*7.3 5.5 3	*7.8 4.6 4	-- -- --	-- 0 --

TABLE 96

MILTA-CONCEPTS

GIRLS

Grade	5		6		7		8		9	
High Level Winter	6.9 2.7 17	7.7 2.4 18	6.4 2.5 14	6.8 1.9 13	6.8 2.3 16	7.2 3.2 17	6.5 2.9 16	5.9 2.2 15		
			7.5 1.9 13	8.5 3.1 14	5.4 2.3 15	7.6 2.9 15	8.2 2.8 12	8.5 4.1 13	-- -- --	9.3 2.1 7
High Level Summer	6.5 3.2 14	8.3 2.4 15	6.2 2.6 16	6.6 2.9 16	7.1 3.6 15	7.9 3.0 15	7.1 3.4 15	10.7 14.5 14		
			7.5 2.9 22	8.8 2.7 22	5.7 2.9 20	6.5 2.5 19	8.4 3.2 19	9.0 2.6 18	6.8 2.9 12	7.5 2.4 0
Medium Level Winter	6.0 2.8 24	6.7 2.8 29	3.6 2.0 23	4.5 2.5 29	5.7 3.2 20	6.3 3.8 19	5.6 2.7 21	6.0 2.9 20		
			6.2 2.9 19	7.4 2.3 22	5.0 2.9 19	5.9 2.9 19	6.5 2.7 22	6.9 3.2 22	-- -- --	-- -- --
Medium Level Summer	6.6 3.0 21	7.3 2.1 23	4.1 2.3 20	4.2 2.8 21	4.9 3.2 19	5.8 2.8 19	5.0 2.3 20	5.8 3.3 20		
			6.8 2.9 28	7.8 3.6 26	5.1 3.0 26	4.9 3.8 25	5.1 2.5 17	5.8 3.5 19	-- -- --	-- -- --
Low Level Winter	2.7 2.0 12	8.8 17.2 12	1.6 1.8 8	2.5 1.7 8	2.[illegible] 2.6 10	3.5 2.9 10	3.3 3.0 9	3.9 2.6 8		
			2.3 1.5 4	2.0 1.4 2	1.5 .7 2	1.8 1.1 5	2.8 1.7 6	3.6 2.0 7	-- -- --	2.8 1.2 6
Low Level Summer	3.0 2.2 8	4.9 2.7 15	2.5 1.6 13	3.7 5.3 13	1.4 1.4 8	2.4 2.7 8	2.0 2.2 7	3.0 2.3 9		
			3.6 3.1 8	5.6 1.9 5	2.4 2.1 5	2.3 1.2 6	5.7 3.1 3	-- -- --	-- -- --	-- -- --

TABLE 97

RAVEN
(CORRECT RESPONSES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	30.2 5.3 17	-- -- --	-- -- --	-- -- --	39.3 5.4 15	-- -- --	42.9 7.0 17	-- -- --		
			34.8 7.4 13	-- -- --	40.6 5.6 14	-- -- --	42.4 4.6 11	-- -- --	-- -- --	-- -- --
High Level Summer	*32.4 7.1 18	-- -- --	35.1 7.3 16	-- -- --	33.6 10.2 16	-- -- --	41.8 4.8 14	00 00 0		
			31.1 7.0 20	-- -- --	38.2 5.0 20	-- -- --	40.6 5.1 18	-- -- --	-- -- --	-- -- --
Medium Level Winter	23.9 8.4 28	-- -- --	31.8 8.3 26	-- -- 0	34.2 8.7 20	-- -- --	37.6 8.0 20	-- -- --		
			28.8 9.5 24	-- -- --	35.9 8.7 19	-- -- --	36.1 6.1 22	-- -- --		
Medium Level Summer	22.8 7.1 23	-- -- --	*33.0 6.9 19	-- -- --	34.1 7.2 19	-- -- --	32.9 7.3 17	-- -- --		
			25.6 9.8 27	-- -- --	32.4 9.7 23	-- -- --	33.3 8.5 19	-- -- --	-- -- --	
Low Level Winter	17.8 6.6 13	-- -- --	19.9 8.0 7	-- -- --	21.2 10.7 12	-- -- --	27.7 10.4 11	-- -- --		
			20.2 8.2 5	-- -- --	29.8 5.4 5	-- -- --	31.0 8.4 8	-- -- --	-- -- --	
Low Level Summer	19.3 6.7 16	-- -- --	23.6 9.2 13	-- -- --	22.0 7.7 8	-- -- --	25.2 11.0 9	-- -- --		
			*21.1 7.4 8	-- -- --	25.9 8.6 8	-- -- --	*33.3 11.5 4	-- -- --	-- -- --	-- -- --

TABLE 98

RAVEN
(STRUCTURAL ERRORS)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	11.9 7.8 17	-- -- --	9.4 5.2 12	-- -- --	12.3 9.1 15	-- -- --	10.5 7.3 17	-- -- --		
			14.2 9.6 13	-- -- --	14.9 8.6 14	-- -- --	7.4 5.9 11	-- -- --	-- -- --	-- -- --
High Level Summer	16.0 8.0 18	-- -- --	18.2 7.5 16	-- -- --	16.9 12.2 16	-- -- --	10.9 6.4 14	-- -- --		
			*12.7 10.6 20	-- -- --	*13.2 7.0 20	-- -- --	7.6 4.6 18	-- -- --	-- -- --	
Medium Level Winter	16.7 12.8 28	-- -- --	16.7 8.8 26	-- -- 0	16.3 13.2 20	-- -- --	11.4 8.7 20	-- -- --		
			16.8 12.3 24	-- -- --	11.8 6.4 19	-- -- --	10.7 6.1 27	-- -- --	-- -- --	
Medium Level Summer	17.3 13.7 23	-- -- --	*14.7 8.4 19	-- -- --	*14.3 9.5 19	-- -- --	12.8 7.0 17	-- -- --		
			*16.4 10.4 27	-- -- --	18.4 14.6 23	-- -- --	17.2 10.9 19	-- -- --	-- -- --	
Low Level Winter	26.0 12.9 13	-- -- --	18.0 14.3 7	-- -- --	20.0 11.0 12	-- -- --	19.3 15.4 11	-- -- --		
			14.6 5.9 5	-- -- --	18.8 12.7 5	-- -- --	15.9 10.2 8	-- -- --		
Low Level Summer	28.4 11.7 16	-- -- --	25.3 12.8 13	-- -- --	*19.8 8.7 8	-- -- --	20.0 19.4 9	-- -- --		
			25.4 14.8 8	-- -- --	24.6 10.8 8	-- -- --	8.3 1.7 4	-- -- --	-- -- --	-- -- --

TABLE 99

G.S.A.T.
(CORRECT RESPONSES)

GIRLS

Grade	5		6		7		8		9	
High Level Winter	15.9 6.8 18	-- -- --	25.1 5.2 14	-- -- --	18.7 6.5 16	-- -- --	24.6 7.0 16	-- -- --		
			16.7 5.6 15	-- -- --	18.3 6.6 10	-- -- --	24.1 3.4 15	26.7 4.6 13	-- -- --	29.0 2.8 2
High Level Summer	15.1 5.1 17	-- -- --	21.2 4.1 14	-- -- --	*18.8 4.2 14	-- -- --	*24.9 6.6 12	-- -- --		
			16.4 4.5 22	-- -- --	*22.9 4.0 14	-- -- --	*24.8 4.5 19	*26.9 4.6 18	-- -- --	26.7 4.5 7
Medium Level Winter	13.7 5.0 26	-- -- --	19.0 3.8 28	-- -- --	17.2 5.9 19	-- -- --	23.5 7.5 20	-- -- --		
			15.2 7.2 22	-- -- --	11.8 8.1 11	-- -- --	18.1 6.8 20	-- -- --	-- -- --	-- -- --
Medium Level Summer	12.5 5.6 20	-- -- --	18.7 5.2 20	-- -- --	15.0 5.1 21	-- -- --	22.3 6.4 18	-- -- --		
			15.6 6.2 27	-- -- --	*20.0 5.2 18	-- -- --	17.4 7.4 15	-- -- --	-- -- --	-- -- --
Low Level Winter	9.8 3.3 13	-- -- --	14.0 4.2 8	-- -- --	12.7 3.2 10	-- -- --	17.1 6.8 9	-- -- --		
			7.3 7.3 4	-- -- --	12.2 1.3 5	-- -- --	14.5 5.3 8	-- -- --	-- -- --	-- -- --
Low Level Summer	*10.1 2.9 16	-- -- --	11.2 4.9 13	-- -- --	*14.3 4.8 9	-- -- --	15.1 5.7 7	-- -- --		
			*11.3 4.6 6	-- -- --	*13.9 7.4 8	-- -- --	*18.3 9.0 4	-- -- --	-- -- --	-- -- --

APPENDIX IV

CORRELATIONS BETWEEN MENTAL AND PHYSICAL GROWTH

Legend:

Numbers in columns indicate the correlations of each mental testing with the longitudinal measurements of physical growth. Top number refers to the first, and bottom number to the last physical examination.

Variables which have not been tabulated did not show any relationship with physical growth.

Range of N indicates fluctuation of sample during the six physical examinations referred to in respective column.

TABLE 100

NUMERICAL ANALOGIES
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)	16	19	13	15				11	9	6	8	8	12			
	23	23	17	18				19	10	8	10	10	23			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	61*	44*	44	33	NS	NS	NS	NS	45	80*	64	53	NS	X	NS	X
	53*	44*	33	33					33	80*	55	48				
	35	29	23	12					32	81*	54	50				
	58*	44*	46	36					36	80*	47	45				
	63*	-17	40	33					30	72	50	19				
	68*	33	41	35					17	77*	37	11				
Shoulder Width	NS	NS	NS	NS	NS	NS	NS	-16	NS	53	49	42	NS	X	NS	X
								-50		45	42	33				
								-39		69	51	48				
Pelvic Width	NS	NS	NS	NS	NS	NS	NS	NS	45	67	51	39	NS	X	NS	X
									73*	83*	86*	46				
									28	54	35	29				
Weight	NS	NS	NS	NS	NS	NS	NS	NS	49	67	59	60	NS	X	NS	X
									50	67	60	50				
									51	69	61	58				
									48	79*	59	66				
									50	66	59	46				
									52	79*	61	63				
Dental Index	-35	NS	NS	NS	NS	NS	NS	NS	NS	59	NS	72	NS	X	70	X
	-22									62		X				
	-49									58		X				
	-26									X		X				
	X									X		X				
	14									X		X				

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)			10	11	13				16		16		5		5-9	
			11	13	21				21		19		12			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS	NS	-04	07	NS	NS	NS	NS	32	NS	26	NS	86*	X	67	X
			24	06					46		31		83*		50	
			48	-05					29		37		86*		57	
			48	51					27		28		47		47	
			48	08					27		27		X		X	
			44	05					23		23		46		38	
Shoulder	NS	NS	NS	NS	38	NS	NS	NS	NS	NS	NS	NS	57	X	97*	X
					52								56		72	
					33								60		98*	
Pelvic Width	NS	NS	NS	-27	NS	NS	NS	NS	36	NS	35	NS	45	X	90*	X
				51					41		43		-33		90*	
				07					42		23		-60		99*	
Weight	NS	NS	13	-24	NS	NS	NS	NS	47*	NS	42	NS	53	X	19	X
			48	-04					42		43		73*		71	
			17	-36					33		39		74*		69	
			45	65*					29		40		69*		50	
			50	-14					24		26		X		X	
			58	-10					28		34		82*		55	
Dental Index	NS	NS	-33	-56	NS	NS	NS	NS	NS	NS	NS	NS	NS	X	96*	X
			-63	-53												
			-69	-44												
			-33	-55												
			X	X												
			-25	-33												

TABLE 101

NUMERICAL ANALOGIES
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)	16	18	14	15		13		11		6	8	8				
	23	23	17	18		19		19		8	10	10				
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	-57*	-35	-47	-42	NS	34	NS	NS	NS	-56	-41	-70*	NS	X	NS	X
	-41	-42+	-47	-39		32				-57	-30	-81*				
	-44*	-26	-27	-24		31				-58	-30	-82*				
	-55*	-26	-43	-47*		24				-60	-24	-88*				
	-57*	04	-35	-34		07				-54	-16	30				
	-56*	-13	-35	-36		17				-58	-26	-77*				
Shoulder Width	NS	NS	NS	NS	NS	13	NS	-14	NS	-50	NS	-68	NS	X	NS	X
						54*		49		-53		-73*				
						45		42		-63		-87*				
Pelvic Width	NS	NS	NS	-09	NS	NS	NS	NS	NS	NS	-50	NS	NS	X	NS	X
				-50							-43					
				-08							-48					
Weight	NS	NS	NS	-19	NS	NS	NS	NS	NS	-57	-45	-31	NS	X	NS	X
				-19						-56	-40	-18				
				-24						-57	-45	-15				
				-38						-64	-50	-27				
				-27						-54	-41	03				
				-36						-54	-49	-25				
Dental Index	-35	NS	NS	NS	NS	35	NS	NS	NS	NS	NS	NS	NS	X	NS	X
	-32					30										
	-49					36										
	-26					45										
	X					X										
	-14					47										

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)		11		11	11					15	16	15	5		4	
		14		13	21					17	19	19	12		6	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS	26	NS	NS	-34	NS	NS	NS	NS	-32	-25	-45	-56	X	NS	X
		45			-41					-32	-28	-44	-49			
		55*			-34					-27	-27	-43	-54			
		44			-38					-22	-26	-43	07			
		48			-33					-19	-26	-43	X			
		47			-31					-17	-21	-40	24			
Shoulder Width	NS	44	NS	46	-33	NS	NS	NS	NS	-30	NS	-NS	-55	X	-78	X
		23		66*	-44					-31			-43		-20	
		35		26	-48					-27			-53		-85	
Pelvic Width	NS	36	NS	66*	-45+	NS	NS	NS	-46	-22	-35	-NS	-68*	X	-67	X
		21		70*	-30				-51	-28	-42		-39		-44	
		42		34	-24				-23	-24	-18		-30		-77	
Weight	NS	47	NS	50	-27	NS	NS	NS	-46	-27	-42	-37	-46	X	-65	X
		34		37	-35				-47	-26	-45	-41	-67*		-39	
		52		61*	-31				-47	-23	-41	-40	-72*		-51	
		20		15	-38				-51	-20	-44	-37	-34		-59	
		43		52	-36				-29	-27	-24	-34	X		X	
		32		47	-37				-43	-21	-38	-38	-32		-97*	
Dental Index	44	NS	NS	NS	-42	NS	NS	NS	NS	-22	NS	-19	-14	X	-91*	X
	01				-53					-32		-25	-59		X	
	52				-37					-22		-16	X		X	
	52				-23					-18		-37	X		X	
	X				X					-19		29	X		X	
	41				-04					-27		-16				

TABLE 102

VERBAL ANALOGIES II
(CORRECTLY SOLVED SIMPLE ANALOGIES)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)	16 23	19 23	14 17		14 19		9 19	11 19				8 10				
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	46*	54*	52*	NS	-38	NS	-26	NS	NS	NS	NS	69*	26	X	NS	
	37	44*	30		-42		-26					73*	29			
	30	35	29		-38		-17					74*	17			
	46*	54*	57*		-62*		-13					77*	X			
	49*	-16	44		-21		72					73*	21			
	48*	57*	46		-51*		-19					70*	15			
Shoulder Width	NS	NS	NS	NS	-49*	NS	-23	NS	NS	NS	NS	NS	30	NS	38	
					-64*		-60*						61		42	
					-63*		-62*						54		36	
Pelvic Width	NS	NS	NS	NS	-21	NS	NS	NS	NS	41	NS	55	NS	X	NS	
					-60*					53		64*				
					-37					32		57				
Weight	NS	NS	NS	NS	-34	NS	-41	NS	NS	NS	NS	58	12	X	NS	
					-34		-40					60	09			
					-33		-26					57	07			
					-51*		-30					70*	52			
					-37		X					48	--			
					-50*		-34					71*	44			
Dental Index	NS	NS	NS	NS	-40	NS	NS	-40	NS	68	NS	86	NS	X	49	
					-37			-44				86				
					-17			-44		20		64				
					-28			-47		14						
					X					X						
					-49		-45	-45		X						

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)			10 11	11 13	13 20	14 19		14 17					5 12		4 6	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS	NS	02	NS	27	09	NS	29	19	NS	NS	NS	68*	X	-43	
			27		33	24		32	23				61+		-53	
			-38		40	30		35	22				62*		-53	
			37		56*	30		49	18				-04		-61	
			40		25	09		36	19				X		X	
			38		29	10		36	16				-16		-74	
Shoulder Width	NS	NS	NS	NS	47*	47*	NS	38	NS	NS	NS	NS	45	X	NS	
					66*	53*		60					22			
					25	15		34					-11			
Pelvic Width	NS	NS	NS	-19	NS	NS	NS	NS	NS	NS	NS	NS	71*	X	NS	
				50									-07			
				14									01			
Weight	NS	28	44	NS	32	22	NS	53	NS	NS	NS	NS	44	X	NS	
		38	39		42	39		50					74*			
		19	36		42	38		48					96*			
		10	49		48	28		59					39			
		23	55		25	12		48					--			
		28	59		29	09		46					45			
Dental Index	50	NS	-76	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	X	NS	
	-22		-72													
	50		-89													
	45		-74													
			--													
			-69													

TABLE 103

QDR I
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	16 23		14 17	15 18	14 19			11 19	9 11		8 10			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	48* 41 31 51* 39 37	X	57 43 37 53 50 50	38 24 20 50 37 38	NS	X	NS	NS	NS	X	NS	NS	NS	X
Shoulder Width	NS	X	NS	NS	-30 -45 -41	X	NS	45 05 18	NS	X	NS	NS	NS	X
Pelvic Width	NS	X	NS	NS	-18 -37 -37	X	NS	NS	28 51 -17	X	49 46 18		NS	X
Weight	NS	X	NS	NS	NS	X	NS	34 38 35 37 26 42	22 25 26 19 39 34	X	NS	NS	NS	X
Dental Index	NS	X	NS	NS	-33 -21 06 -15 X -39	X	NS	NS	NS	X	NS	NS	NS	X

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)				11 13							16 19		5 12		4 6
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS	X	NS	NS	NS	X	NS	NS	NS	X	NS	NS	87* 83* 84* 49 X 43	X	57 55 55 49 00 47
Shoulder Width	NS	X	NS	NS	NS	X	NS	NS	NS	X	NS	NS	81* 66 31	X	
Pelvic Width	NS	X	NS	-53 55 -19	NS	X	NS	NS	NS	X	NS	NS	NS	X	
Weight	NS	X	NS	-37 -29 -51 33 -39 -34	NS	X	NS	NS	NS	X	-32 -42 -44 -44 -44 -41	NS	62 68 63 87* X 91*	X	
Dental Index	NS	X	NS	NS	NS	X	NS	NS	NS	X	NS	NS	07 -50 X X X	X	

TABLE 104

QDR I
(STRUCTURAL ERRORS)

Correlations With Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	16 23		13 17					11 19	9 11		8 10			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-54* -46* -37 -57* -42 -40		-57* -43 -37 -53* -50* -50+	NS	NS	NS	NS				NS			
Shoulder Width	NS		NS				NS	-40 15 02	NS	NS	NS			
Pelvic Width	NS		NS				NS	NS	-28 -51 17	NS	-49 -46 -18	NS	NS	NS
Weight	NS		NS				NS				NS			
Dental Index	NS		NS				NS				NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)				11 13									5 12	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				NS	NS	-90* -86* -87* -49 -- -43	NS
Shoulder Width	NS		NS				NS				NS	NS	-86* -66 -31	NS
Pelvic Width	NS		NS	53 -55 19	NS	NS	NS				NS			
Weight	NS		NS				NS				NS	NS	-73* -77* -74* -87* -- -91*	NS
Dental Index	NS		NS				NS				NS			

TABLE 105

QDR II
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		16 23			15 19	13 18	7 19		9 11	9 10	8 10	7 10		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	51* 41 29 55* 49+ 47+	NS	NS	NS	17 22 09 39 40 23	22 23 15 36 17 32	NS	-45 47 -45 -33 -40 -40	-42 -50 -52 -60 05 -68*	45 36 33 22 33 14	27 37 39 43 -00 50	NS	X
Shoulder Width	NS	18 34 43	NS	NS	-23 -43 -42	NS	NS	NS	-53 -52 -45	-24 -27 -49	NS	NS	NS	X
Pelvic Width	NS	NS	NS	NS	-29 -42 -68*	NS	NS	NS	-39 -17 -58	NS	72 72 48	NS	NS	X
Weight	NS				NS		NS	NS	-48 -48 -45 -49 -47 -51	NS	46 51 00 47 62 61	NS	NS	X
Dental Index	NS				NS		NS	NS	-39 -50 -50	NS	NS	NS	NS	X

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)		11 15		10 12		14 20							5 12		4 6
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS	-31 -44 -49 -41 -52 -51		28 42 28 26 31 32	NS	31 28 28 50 39 48+					NS	NS	61 54 51 29 X 12	X	48 36 41 32 00 29
Shoulder Width	NS	-63* -48 -46	NS	NS	NS	38 64* 41			NS		NS	NS	66 75 75	X	85 43 99
Pelvic Width	NS	-55* -20 -35	NS	NS	NS	38 52+ 44	NS	NS	NS	28 35 31	NS	NS	11 69 56	X	74 75 46
Weight	NS	-30 -53* -40 -26 -41 -32	NS	54 55 39 44 44 51	NS	32 25 24 37 49 44					NS	NS	53 61 63 71 67	X	
Dental Index	NS		NS	-57 -29 -83 -51 -42	NS	NS			NS		NS	NS	46 50	X	

TABLE 106

QDR II
(DIRECTIONAL ERRORS)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	16 24	17 23	13 18				7 19		9 11	15 17	8 10			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-18	-36	-53	NS	NS	NS	-37	NS	34	16	-38	NS	NS	NS
	-52*	-22	-28				-35		34	25	-34			
	-01	-19	-22				-34		33	27	-33			
	-24	-29	-47				-42		39	34	-30			
	X	-26	-49				-06		40	-15	-57			
	-04	-22	-46				-44		19	43	-31			
Shoulder Width	NS	NS	NS	NS	NS	NS	NS	NS	36	NS	NS	NS	NS	NS
									26					
									25					
Pelvic Width	NS				NS		NS	NS	43	NS	-65	NS	NS	NS
									13		-55			
									55		-73			
Weight	NS				NS				48	-29	-40	NS	NS	NS
									47	-34	-51			
									49	-38	-55			
									54	-20	-47			
									53	-48	-57			
									55	-15	-51			
Dental Index	NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)		11 15			10 12		10 17					15 19	6 12		4 6
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS	-36	NS	NS	-40	NS	-45	NS	NS	NS	NS	-34	-68*	NS	-47
		-22			-41		-45					-35	-62		-35
		-19			-30		-44					-33	-60		-40
		-29			-24		-45					-32	-35		-32
		-26			-32		-45					-31	X		00
		-22			-30		-45					-30	-17		-31
Shoulder Width	NS				NS		-51	NS	NS		NS	NS	-72*	NS	-82
							-34						-77		-40
							-60						-85*		-99
Pelvic Width	NS		NS	NS	-42	NS	-49	NS	NS	NS	NS	NS	-50	NS	-71
					-29		-23						-83*		-73
					-25		-61						-72		-95
Weight	NS	NS	NS	NS	-40	NS	-52	NS	NS		NS	NS	-67*	NS	
					-32		-56						-71*		
					-26		-59						-72*		
					-25		-58						-66		
					-29		-58						X		
					-29		-61						-60		
Dental Index	NS				NS				NS		NS	NS	-45	NS	
													-69		
													X		
													X		
													X		

TABLE 107

MILTA VOCABULARY

Correlations with Physical Growth

Boys, High Level

Winter Subjects

															10	10
Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 FU
N (range)				15 18				9 19				7 10				
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS		NS	51* 51* 12 -33 47 42	NS	NS			NS				NS		-46 -48 -47 -51 00 -58	
Shoulder Width	NS				NS		NS	-29 -39 -45	NS	NS			NS			-60 -60 -55
Pelvic Width	NS				NS				NS		NS	59 38 18	NS	NS	NS	
Weight	NS		NS	17 54* 15 -01 13 -04	NS	NS			NS				NS		NS	
Dental Index	NS				NS				NS				NS		NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)					1 20		10 17			14 17	16 19		5 12	8 13	4 6
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		NS	NS	43 40 39 42 36 37	NS	32 36 43 53* 39 38	NS	NS	NS	60* 57* 57* 56* 55* 55*	NS	65* 59^{+} 58* -14 -26	NS	-54 -62 -66 -75 00 -86*
Shoulder Width	NS				NS		45 65* 27	NS	NS	NS	57* 61* 59*	NS	NS	-47 -68* -53	NS
Pelvic Width	NS				NS				NS		24 64* 28	NS	NS	NS	NS
Weight	NS				NS		48 44 41 44 36 38	NS	NS	-49* -50 -47 -42 -42 -41			NS		NS
Dental Index	NS				NS				NS				NS		NS

TABLE 108

MILTA
(SENTENCE COMPLETION)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)	16 26	16 23	14 18			12 18		9 19		6 8	8 10	7 10			10
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	40* 35 30 45* 48* 50*	24 22 12 37 29 33	54 61 35 52 46 48	NS	NS	38 37 30 20 07 18	NS	-37 -42 -34 -48 -17 -43	NS	-27 -30 -30 -29 -23 -34	47 44 41 31 00 26	NS	NS	NS	-46 -50 -54 -56 00 -68
Shoulder Width	NS		NS				NS	-32 -41 -44	NS	-56 -59 -51	NS	-61 -64 -41	NS	NS	
Pelvic Width	NS		NS				NS				71 51 43	NS	NS	NS	
Weight	NS		NS				NS	-38 -38 -29 -44 -32 -40	NS	-35 -30 -30 -33 -29 -17					
Dental Index	NS		NS				NS				NS				

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)		11 15	10 11		13 21		10 17			16 21			5 12	8 13	4 6
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS	20 39 56* 65* 43 42	07 34 60 61 56 57	NS	32 35 37 53* 35 37	NS					NS	NS	73* 68* 69* 50 X 37	79* 75* 78* 46 X 46	-81 -42 -80 -78 00 -80
Shoulder Width	NS		NS	NS	37 62* 37	NS	20 50 12	NS	NS	NS	NS	NS	41 21 25	40 30 25	
Pelvic Width	NS		NS	NS	28 41 15	NS	NS	NS	NS	-41 05 -13	NS	NS	89* 39 60	NS	
Weight			NS	NS	26 30 38 51+ 33 38	NS	NS	NS	NS	-26 -45 -50* -50* -48 -42	NS	NS	54 73* 76* 38 -- 46	40 43 44 35 -- 46	
Dental Index	60 48 52 44 X 31	NS	NS	NS	-47 -34 -23 -50 0 -19	NS	NS				NS				

TABLE 109

MILTA ANALOGIES

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)											8 10				
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		NS				NS				54 41 39 28 61 19	NS	NS	NS	-26 -31 -38 -44 00 -46
Shoulder Width	NS		NS				NS				50 42 51	NS	NS	NS	NS
Pelvic Width	NS		NS				NS				48 67* 15	NS	NS	NS	NS
Weight	NS		NS				NS				NS				NS
Dental Index	NS		NS				NS				NS				NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)							10 17			14 17	16 19		5 12	8 13	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		NS				NS				NS	NS	NS	54 57^{+} 55 71* -- 84*	NS
Shoulder Width	NS		NS				34 51 26	NS	NS	-69* -55* -36	NS	NS	NS	30 56 55	NS
Pelvic Width	NS		NS				41 58^{+} 35	NS	NS	-60* -08 -33	-44 -68* -29		-82* -23 -21		
Weight	NS		NS				NS				NS	NS	NS	23 27 23 57 -- 71*	NS
Dental Index	NS		NS				NS				NS				NS

TABLE 110

MILTA CONCEPTS

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 FU
N (range)			14 18						9 11	9 10	8 10					
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Weight	NS	NS	43 48 08 37 26 29	NS	NS	NS	NS	NS	NS	52 48 43 30 03 21	52 42 40 30 -10 23	NS	NS	NS	-25 -24 -32 -35 00 -51	-57 -53 -59 -60 -- -68*
Shoulder Width	NS	NS			NS				NS		34 20 42	NS	NS	NS	NS	
Pelvic Width	NS	NS			NS		NS	NS	50 64* 22	NS	56 58 25	NS	NS	NS	NS	
Weight	NS	NS			NS		NS	NS	64* 63* 65* 59 67 69*				NS		NS	-60
Dental Index	NS	NS			NS				NS				NS		NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		
N (range)						13 17									
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		NS	NS	NS	30 47 41 50 37 35			NS				NS		NS
Shoulder Width	NS		NS	NS	NS	44 75* 39			NS				NS		NS
Pelvic Width	NS		NS	NS	NS	46 35 32			NS				NS		NS
Weight	NS				NS				NS				NS		NS
Dental Index	NS				NS				NS				NS		NS

TABLE 111

RAVEN
(PERFORMANCE)

Correlations with Physical Growth

Boys, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)	16 24		14 18		15 19		9 19				9 11					
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	46* 47* 24 53* 51* 50*	X	61* 48 27 74* 57* 57*	NS	-45 -44 -43 -60* 02 -52*	X	-48* -49* -42 -77* -16 -66*	NS	NS	X	32 33 32 24 10 07	NS	NS	X	X	
Shoulder Width	NS	X	-11 -55* -13	NS	-57* -81* -72*	X	-39 -77* -76*	NS	NS	X	NS	NS	NS	X	X	
Pelvic Width	NS	X	NS	NS	-50* -69* -56*	X	-27 -66* -46	NS	35 38 27	X	55 41 17	NS	NS	X	X	
Weight	NS	X	NS	NS	-44 -45 -47+ -55* -28 -54*	X	-35 -40 -34 -58* -31 -57*	NS	42 36 45 47 40 48	X	37 33 -14 39 33 43	NS	NS	X	X	
Dental Index	NS	X	NS	NS	-50 -35 -19 -23 X -42	X	-44 -33 -12 -26 X -56		NS	X	NS		NS	X	X	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (Range)			10 11		13 21				16 21		16 19		5 12			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS	X	11 39 47 52 54 59	NS	27 27 25 24 16 17	X	NS	NS	37 34 37 44+ 43 39	X	35 37 40 43 42 39	NS	58 57 61 21 X 47	X	X	
Shoulder Width	NS	X	NS	NS	NS	X	NS	NS	NS	X	NS	NS	49 -28 -42	X	X	
Pelvic Width	NS	X	NS	NS	27 26 -13	X	NS	NS	33 42 38	X	33 57* 41	NS	30 -65 -71	X	X	
Weight	NS	X	25 45 13 43 49 48	NS	24 28 25 28 21 28	X	NS	NS	12 25 30 36 27 38	X	NS	NS	44 42 35 -06 X 10	X	X	
Dental Index	NS	X	-57 -66 -82 -52 X -25	NS	NS	X	NS	NS	NS	X	NS	NS	NS	X	X	

TABLE 112

NUMERICAL ANALOGIES
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		22 32	21 31	16 26		19 28			6 21			5 12	8 19	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	-18 -40+ -17 -17 -17 -18	-31 -55* -31 -32 -30 -06	-11 -50* -14 -14 -09 -11	NS	NS	NS	NS	36 57* 39 45 42 49*	NS	NS	28 -53 16 47 46 21	NS	NS
Shoulder Width	NS	-32 -43* -48*	-56* -74* -68*	-38 -49* -56*	NS	NS	NS	NS	47 35 -58*	NS	NS	30 56 25	66	NS
Pelvic Width	NS	-47* -22 -29	NS	-49* -34 -45+	NS	-50* -13 -51*	NS	NS	57* 42 31	NS	NS	11 56 -12	NS	NS
Weight	NS	-51* -63* -49* -48* -46* -47*	NS	-28 -62* -30 -31 -27 -30	NS	NS	NS				NS			
Dental Index	NS		NS				NS				NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	17 29	19 28	16 27				8 10		12 22	13 20	14 23	13 23		12 15
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		15 -56* 13 3 8 -07	NS	NS	NS	NS	NS	-32 -23 -39 -58* -44 -36	NS	NS	NS	NS	31 25 30
Shoulder Width	-36 -34 -43	-31 -45* -49*	-42 -46 -41	NS	NS	NS	-59 -42 -60	NS	-71* -98* -59*	-33 -93 -27	-80* X -66*	-45 -66 -47	NS	NS
Pelvic Width	-39 -36 -27	NS	-65* -45 -25	NS	NS	NS	NS	NS	-32 -91 -50	NS	-66* X -63*	-61* -78 -59*	NS	NS
Weight	NS		NS				NS	NS	-29 -63* -32 -54 -38 -39	-29 -35 -29 -44 -33 -29	-35 -75 -32 -41 -33 -35	-40 -52 -37 -41 -43 -43*	NS	NS
Dental Index	NS		-56	NS	NS	NS	NS				NS			

TABLE 113

NUMERICAL ANALOGIES
(ERRORS)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)			21 31	16 26				8 28						
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		48* 54* 39* 40* 38* 15	36 45+ 42* 42* 40* 21	NS	NS	NS	39+ 57* 42* 37 35 24	NS	NS	NS			
Shoulder Width	NS		49* 57* 59*	45+ 47* 59*	NS	NS	NS				NS			
Pelvic Width	NS		NS	50* 15 38	NS	NS	NS				NS			
Weight	NS		NS	48* 56* 53* 57* 53* 55*	NS	NS	NS				NS			
Dental Index	NS		NS				NS				NS			

Summer Subjects

ALL CORRELATIONS NS.

TABLE 114

VERBAL ANALOGIES II
(CORRECTLY SOLVED SIMPLE ANALOGIES)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)						19 28						7 21	8 19	12 17
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS				NS			-40 -40 -41 -25 -19 -36	58* 68* 52*	NS
Shoulder Width	NS		NS	NS	NS	34 -03 62*			NS		NS	NS	71*	48
Pelvic Width	NS				NS				NS		NS	-53 -57+ 66*	89*	51
Weight	NS				NS				NS		NS	-40 -36 -47* -27 -25 -50	43 72* 46+	NS
Dental Index	NS				NS				NS		NS	-55	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	17 30	20 29			7 12	9 11	8 10		9 22	13 20	14 23	13 23	8 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS		NS	NS	-59* -35 -52* -69* -58 -49*	-42 -45 -42 -20 -12 -37	NS	NS	-41 -44 -40	
Shoulder Width	NS		NS	NS	-64* -36 -50	NS	-44 -32 -48	NS	-82* -89* -45	-40 -66 -36	-63* X -31	NS	-53	NS
Pelvic Width	NS		NS	NS	NS	53 60 33			NS		-43 X -33	-45 -72 -45	-55	NS
Weight	33 40 40+ 49* 33 32	30 22 37 35 21 16			NS		NS	NS	-39 -73 -43 -62+ -55 -44+	-26 -57 -33 -26 -15 -33	-11 63* -15 -11 1 -11	-20 -58* -18 -23 -21 -20	-47 -70* 46	NS
Dental Index	NS		-42	NS	NS	NS	NS	NS	-35 -70* 10	NS			NS	

TABLE 115

VERBAL ANALOGIES II
(CORRECTLY SOLVED TRIPLE ANALOGIES)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)					15 30	19 28					6 17	5 17	8 19	12 17
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				NS	-43 -44 -44 -23 -17 -36	57* 66* 52*	NS
Shoulder Width	NS		NS	NS	59* 45 60*	38 23 68*	NS				NS	NS	67*	50
Pelvic Width	NS		NS				NS				NS	-51 -60 65*	89*	45
Weight	NS		NS				NS				-43 -45 -43 -29 -35 -40	NS	39 72* 42	NS
Dental Index	NS		NS				NS				NS	-61	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	11 29	19 29		14 25	7 12	9 11			9 22	13 21	14 23	13 24	8 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	44 04 41 39 41 29	NS	NS	NS	NS	-51* -50 -42 -61* -54 -47*	-41 -45 -39 -25 -09 -31	NS	NS	-43 -46 -43	NS
Shoulder Width	NS		NS	NS	-62 -40 -51	62+ 53 41	NS	NS	-80* -97* -37	-28 -57 -19	-64* X -31	-84* -95 -52	55	NS
Pelvic Width	NS		NS				NS				-43 X -33	NS	-58*	NS
Weight	30 36+ 38* 41 29 25	37* 31 48* 40* 32 25	NS				NS	NS	-40 -73* -44+ -65* -60 -50*	NS	NS	NS	-55* -71* -55	NS
Dental Index	NS		NS				-46	NS	-48 -82 29	NS	-27 -63 19	NS	NS	NS

TABLE 116

VERBAL ANALOGIES II
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)												5 17	8 19	12 17
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS				NS		NS	40 40 41 25 19 36	-58* -74* -53+	NS
Shoulder Width	NS				NS				NS		NS	NS	NS	51
Pelvic Width	NS				NS				NS		NS	53 60 66*	-90*	54
Weight	NS				NS				NS		NS	NS	-41 -76* -43	NS
Dental Index	NS				NS				NS		NS	55	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	17 30	19 29	16 27			9 11	8 10		10 22	13 20	14 22	13 23	8 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-38* 02 -37* -41* -40* -33	NS	NS	NS	NS	49 41 51 40 35 46	NS	NS	53* 22 44 55 44 38	-43 49 42 21 13 40	42* 28 48* 55* 44* 35	NS	43 48 42	NS
Shoulder Width	NS		NS	NS	NS	36 24 40	NS	NS	NS	45 66 37	55* X 28	75° 91° -36	59*	NS
Pelvic Width	NS		34 38 28	NS	NS	-41 -42 -15			NS		42 X 52	NS	62*	NS
Weight	-38* -40 -43 -48* -35 -33	-31 -17 -30 -31 -15 -02			NS		NS	NS	NS	27 57 33 31 23 35	NS	NS	53* 78* 51*	NS
Dental Index	NS		45	NS	NS	NS	46	NS	NS	NS	4 46 -27	NS	-14	NS

TABLE 117

QDR I
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)								8 28			10 17	7 21		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS	-36 -58* -41 -33 -35 -12	NS	NS	NS	54* 57* 17 64* 64 22	NS	NS
Shoulder Width	NS		NS				NS	05 -67* 03	NS	NS	-55 -85* -42	NS	NS	NS
Pelvic Width	NS		NS				NS				-52 -62 -47	NS	NS	NS
Weight	NS		NS				NS				-41 -54 -50* -12 -13 -50*	NS	NS	NS
Dental Index	NS		NS				NS				NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)							8 10		12 22		14 23		8 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				31 -52 25 37 40 53	NS	-61* -48 -60* -35* -65* -46*	NS	NS			
Shoulder Width	NS		NS				60 61 73*	NS	NS	NS	NS	NS	-51	NS
Pelvic Width	NS		NS				41 24 56	NS	NS	NS	NS	NS	-48	NS
Weight	NS		NS				32 58 31 29 37 59	NS	-61* -54 -63* -95* -90* -57*	NS	NS	NS	-45 -54+ -49+	NS
Dental Index	NS		NS				57	NS	NS	NS	-19 -44 27	NS	NS	NS

TABLE 118

QDR II
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

ALL CORRELATIONS NS.

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	18 30		15 27	14 27				5 11	13 21		14 23	10 22	13 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
	46*	NS	NS	37	NS	NS	NS	-12	NS	NS	-74*	-40	-48*	NS
	06			21				-55			-60*	-30	-45	
	54*			43*				-04			-68*	-33	-46	
Height	42*			30				-22			X	-37		
	34			32				-28			X	-29		
	34			23				-45			-69*	-31		
	31	NS					NS	-38	-55	NS	-70*	-86*	NS	NS
Shoulder	19				NS			-55	-68		X	X		
Width	32							-48	-69*		-82*	-75*		
							NS	-78	-29	NS	-56*	NS	NS	NS
Pelvic	NS				NS			-71	-71		X			
Width								-82	-38		-62*			
			25	25	NS	NS	NS	11	NS	NS	-60*	-46*	NS	NS
			28	39				80			-81*	-63*		
			31	33				-07			-64*	-41		
Weight	NS		20	29				-26			X	-63*		
			29	21				-24			X	-61*		
			27	17				-81			-69*	-46*		
							NS	-37	NS	NS	-66	NS	NS	NS
											-63			
											-61			
Dental	NS				NS									
Index														
								-69						

TABLE 119

QDR II
(DIRECTIONAL ERRORS)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		22 32		16 29				8 25			6 17	6 17		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	-33 -23 -32 -34 -34 -22			NS				NS				NS	
Shoulder Width	NS				NS		NS	36 11 76*	NS	NS	NS	-51 -02 -22	NS	NS
Pelvic Width	NS				NS		NS	14 46 56	NS	NS	NS	-59 -30 -53	NS	NS
Weight	NS	-44* -38* -43* -47* -48* -48*	NS	-34 -44 -32 -35 -41+ -35	NS	NS			NS		NS	-45 -43 -56* -20 -21 -59*	NS	NS
Dental Index	NS				NS				NS		-48 05 -41	NS	-62	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)				15 27		7 10	5 11		13 22	13 19	14 23			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	NS	60 61 64* 58 50 64			NS		74* 52 66* X X 63*	NS	NS	NS
Shoulder Width	NS		NS	42 44 48	NS 60	89* -56 63	-23 -46	NS 52	44 -82 42	-74* X -58	57* 77*	NS	NS	NS
Pelvic Width	NS		NS	NS	NS	59 52 66			NS		47 X 49	NS	NS	NS
Weight	NS		NS	NS	NS	60 60 59 53 51 58			NS		71* 72* 71* X X 67*	NS	NS	NS
Dental Index	NS				NS				NS		62 58 70	NS	NS	NS

TABLE 120

QDR II
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		22 32		16 29						8 21			7 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS				NS				NS	
Shoulder Width	NS				NS				NS		NS	NS	50	NS
Pelvic Width	NS	44* 26 36			NS		NS	NS	NS	22 -68 20			NS	
Weight	NS	35* 34 34 39* 40* 41*	NS	41* 45 40+ 47* 49* 46*	NS	NS			NS				NS	
Dental Index	NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	17 30			14 27		7 10		5 11	14 22			12 22	13 17	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	-46* -41 -55* -48* -47* -44*	NS	-18 -23 -28 -54 -61 -60	NS	67 75 72 60 53 63	NS	NS	NS	66* 14 57* 51 51 58*	48* 45 48+	NS
Shoulder Width	-44+ -48* -36	NS	NS	-35 -34 -40	NS	-64 -75* -76*	NS	57 68 43	NS	NS	NS	64* 75* 79*	NS	NS
Pelvic Width	NS		NS	NS	NS	-42 -29 -56	NS	96* 86+ 96*	47 78 54	NS			NS	
Weight	-36* -33 -34 -34 -27 -17	NS	NS	-27 -33 -35 -47* -31 -33	NS	-60 -62 -58 -66+ -68* -70+	NS	83* 87+ 88* 81* 78 83	32 54 37 40 44 47*	NS	NS	47* 57* 49* 61* 65* 60*	NS	NS
Dental Index	NS				NS		NS	79	NS	NS	NS	38 59 30	NS	NS

TABLE 121

MILTA-SENTENCE COMPLETION

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)					15 31	17 28					6 17		7 18	11 17
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	39* 40 31 42* 40* 47*		NS				NS	NS	47* 54 45	NS
Shoulder Width	NS		NS	NS	57* 24 59*	44 40 50*	NS				NS	NS	56+	65*
Pelvic Width	NS		NS				NS				NS	NS	66*	NS
Weight	NS		NS				NS				-41 -54 -52* -01 04 -58*	NS	31 68* 37	NS
Dental Index	NS		NS				NS				NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	17 30	19 29					5 11	5 11	13 22	13 19	14 23	13 22		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	40* 24 46* 39* 32 36	51* 44* 56* 55* 53* 57*	NS				NS				-43+ -18 -38 X X -26	NS	NS	NS
Shoulder Width	NS		NS				NS	NS	NS	-59 -98* -79*	-82* X -55*	-54 X -52	NS	NS
Pelvic Width	NS		NS				47 40 53	41 43 52	-47 -97* -74*	NS	-56* X -62*	-77* X -82*	NS	NS
Weight	NS	45* 55* 52* 63* 55* 49*	NS				NS	46 38 46 52 46 41	NS	NS	-35 -79* -41+ X X -41+	-27 -61° -23 -37 -33 -25	NS	NS
Dental Index	NS		NS				NS				-41 -74 34	-14 -34 -25	NS	NS

TABLE 122

MILTA ANALOGIES

Correlations with Physical Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)							7 20						7 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				NS			
Shoulder Width	NS		NS				-16 51 13	NS	NS	NS	NS	NS	67*	NS
Pelvic Width	NS		NS				NS				NS	NS	60*	NS
Weight	NS		NS				NS				NS	NS	31 51 35	NS
Dental Index	NS		NS				NS				NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)							5 11			13 20	14 23	13 22		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				38 45 34 40 43 44	NS	NS	NS	-61* -14 -60* X X -57*	NS	NS	NS
Shoulder Width	NS		NS				24 46 9	NS	NS	-65* -93+ -29	-79* X -49*	-57+ X -51	NS	NS
Pelvic Width	NS		NS				43 38 51	NS	NS	NS	-28 X -54+	NS	NS	NS
Weight	NS		NS				NS				-63* -71* -68* X X -65*	-46* -61* -54* -80* -66* -57*	NS	NS
Dental Index	NS		NS				83	NS	NS	NS	-21 -67 74	-37 -75 71	NS	NS

TABLE 123

MILTA CONCEPTS

Correlations with Cognitive Growth

Boys, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)					15 31	17 28		8 25	6 22			8 17	7 18	11 16
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	43* 31 38* 39+ 37 31	41* 51* 41* 38+ 36 33	NS				NS	NS	NS	59* 66* 46
Shoulder Width	NS		NS	NS	NS	23 35 19	NS				NS	NS	70*	NS
Pelvic Width	NS		NS				NS	-43 -36 -42	NS	NS	NS	NS	61*	56
Weight	NS		NS	NS	NS	28 44 27 30 33 37	NS	NS	-51* -48+ -53* -29 -29 -56*		NS	NS	32 66* 37	39 63* 42
Dental Index	NS		NS				NS				-54 -18 -51	-58	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	18 30	19 29				7 10	5 11	5 11	3 22	10 20	14 22	13 21		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	32 22 36 34 41 36	NS	NS	NS	-28 -40 -26 -36 -37 -51	NS				-48* -09 -53* X X -55*	NS	NS	NS
Shoulder Width	NS		NS	NS	NS	-59 -65 -73+	NS	NS	NS	-58 -76* -25	-81* X -79*	-38 -96 -49	NS	NS
Pelvic Width	33 42 48*	NS	NS				38 30 35	40 46 37	-04 -52 -03	NS	-41 X -53+	NS	NS	NS
Weight	29 42 37* 40* 25 30	22 29 34 40* 33 38+	NS				NS				-42+ -81* -43* X X -53*	NS	NS	NS
Dental Index	NS		NS				61 63	-47	NS	NS	-28 -35 -14	NS	NS	NS

TABLE 124

NUMERICAL ANALOGIES
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	2 8	8	7 8	5 7	9 10		9 11	9 11			8 10	8 9		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-52 -48 -54 -60 -69 -22	-34 -34 -33 -29 -29 -75	NS	-28 -29 -44 -38 -42 -49	NS	NS	NS	-44 -49 -48 -45 -58 -55	NS	NS			NS	
Shoulder Width	NS	68 04 -63	NS	NS	80& 83* 68*	NS	25 52 32	25 62 33	NS	NS	61 35 58	62 47 55	NS	NS
Pelvic Width	-63 -53 -22	NS	-16 -55 -57	03 -58 -40	NS	NS	45 44 39	NS	NS	NS	48 -21 67	NS	NS	NS
Weight	NS				NS		NS	37 -42 -45 -46 -37 -44	NS	NS	32 29 34 31 34 34	NS	NS	NS
Dental Index	NS		NS	100 50 49 36	NS	NS			NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)				4	3 5						4 5	4		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	-68 -78 -91 -94+ -92 -93+	NS			NS		-97* -98* -99* -100* -100* -100*	-93 -94 -99* -96* -97* -97*	NS	NS
Shoulder Width	NS				NS				NS				NS	
Pelvic Width	NS				NS				NS				NS	
Weight	NS		NS	79 84 88 91 89 90	NS	NS					-90 -93+ -91 -98* -100* -100*	-87 -84 -84 -92 -99* -96*	NS	NS
Dental Index	NS				NS				NS				NS	

TABLE 125

QDR I
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)			7 8	5 7	9 10						8 10			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		-51 -52 -54 -54 -53 15	-48 -47 -30 -18 -01 -35	NS	NS			NS		-50 -66 -61 -54 -72* -74*	NS	NS	NS
Shoulder Width	NS		-43 -55 18	17 -68 -35	-69	NS			NS				NS	
Pelvic Width	NS		NS	-41 -06 -40	NS	NS			NS				NS	
Weight	NS		-56 -66 -69 -59 -56 3	-45 -29 -56 -39 -22 -50	NS	NS			NS		-61 -57 -57 -64 -53 -57	NS	NS	NS
Dental Index	NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)								4 5						
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS				NS				NS	
Shoulder Width	NS				NS				NS				NS	
Pelvic Width	NS				NS		NS	-94+ -74 -76	NS	NS			NS	
Weight	NS				NS		NS	-77 -79 -79 -83 -86 -93+	NS	NS			NS	
Dental Index	NS				NS		NS	-97 -97 -66 -21	NS	NS			NS	

TABLE 126

QDR II
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		8	8	5 7	8 10		8 11	8 11			8 9	7 9		2 4
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	-53 -55 -65 -69 -71* 69	-85* -82* -85* -77* -74* -51	19 08 -01 -06 -05 86+	-54 -58 -61 -62 -69* -24*	NS	NS	72* 68* 63* 60 55 47	NS	NS	NS	-12 -57 -35 -29 -62 -68	NS	-45 -45 -46 06 -100* -11
Shoulder Width	NS		NS				NS	24 50 59	NS	NS	NS			
Pelvic Width	NS	29 -67 71*	-51 -73* -50	NS	-63* -71* -69*	NS	NS				75 19 63	-52 -68 -25	NS	NS
Weight	NS	-65 -78* -60 -66 -74* 63	-55 -43 -49 -51 -52 -59	NS	-54 -54 -58 -61 -59 -60	NS	NS	59 61+ 60 58 58 49	NS	NS	NS			
Dental Index	NS		NS	46 -81 46 87	NS	NS	9 -57 -52 -26	NS	NS	NS	-67	64 63	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	4 8	5 7		4	3 5			5						
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-38 -41 -72 -80+ -70 -79	-52 -55 -55 89* -88* -82	NS				NS				NS			
Shoulder Width	NS		NS	65 49* 73	NS	NS	NS	-91* -95* -91*	NS	NS	NS			
Pelvic Width	NS		NS				NS				NS			
Weight	NS		NS	82 77 79 79 76 79	-84 -89 -97 -100* -100* -87	NS	NS				NS			
Dental Index	NS		NS				NS				NS			

TABLE 127

QDR II
(DIRECTIONAL ERRORS)

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	8		8	5 7			8 10	8 11			7 10	7 8		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-67 -04 -51 -52 -47 -51	NS	-85* -82* -85* -77* -74* -51	NS	NS	NS	71* 70* 73* 75* 74* 74*	NS	NS	NS	NS	48 56 56 55 62 55	NS	NS
Shoulder Width	11 -60 -43	NS			NS		NS	-34 -76* -69*	NS	NS			NS	
Pelvic Width	-87* -31 -57	NS	-51 -73* -50	NS	NS	NS	60 55 51	NS	NS	NS	NS	91* 38 82*	NS	NS
Weight	-48 -36 -54 -54 -48 -63	NS	-55 -43 -49 -51 -52 -59	NS	NS	NS	70* 69* 70* 67* 64* 64	NS	NS	NS	NS	51 18 47 46 49 46	NS	NS
Dental Index	NS		NS	40 55 43	NS	NS			NS		57	-59	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	4 8	5 7				5 6		5 5		3 5				
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	92* 90* 93* 54 45 85	NS	NS	NS	84 87+ 85 83 81 75	NS	-97* -100* -99* -98* -99* -98*	NS	73 80 91* 90 94+ 96			NS	
Shoulder Width	NS				NS				NS				NS	
Pelvic Width	NS		NS	NS	NS	77 95* 67			NS				NS	
Weight	NS		NS	NS	NS	86+ 88* 88* 89* 91* 83	NS	-86 -86 -87 -84 -80 -60	NS	NS			NS	
Dental Index	NS		NS	NS	NS	98 71 64 47			NS				NS	

TABLE 128

QDR II
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	8		8	5 7			8 11	8 11			8 10	7 9		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		80* 81* 90* 85* 83* 14	NS	NS	NS	NS	-50 -52 -57 -52 -55 -58	NS	NS	NS			
Shoulder Width	NS		NS				NS				NS			
Pelvic Width	60 19 47	NS	NS				NS				-52 -37 -66	-58 33 -57	NS	NS
Weight	54 39 58 49 36 36	NS	66 65 58 58 62 20	NS	NS	NS	-48 -47 -44 -43 -43 -46	NS	NS	NS	NS			
Dental Index	NS		NS	-56 -13 -59	NS	NS	23 51 49 -13	NS	NS	NS	NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	4 8		5 6				2 5	4 5		3 5				
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		74 73 73 37 27 72	NS	NS	NS	75 84 87 90* 91* 89*	73 83 85 89 92 93+		-95* -96* -74 -97 -84 -91	NS			
Shoulder Width	NS		NS				79 90* 78	NS	NS		NS			
Pelvic Width	NS		NS				55 87 48	NS	NS	NS	NS			
Weight	NS		NS				NS	81 84 88 90 89 85	NS	-90* -82 -87 -100* -91 -97	NS			
Dental Index	68 11 -72 82	NS	NS				NS	NS	NS	99 58 75	NS			

TABLE 129

MILTA VOCABULARY

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	8			5 7		9 11	8 11	8 11	6 8			7 9		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	52 49 63 52 50 12	NS			NS		-23 -28 -39 -43 -48 -64	NS	-84* -84* -81* -81* -84* -77	NS	NS	-48 -52 -56 -45 -63 -64	NS	NS
Shoulder Width	NS		NS	-21 -15 81*	NS	74* 77* 57	65 60 20	48 69 48	-80+ -82* -88*	NS			NS	
Pelvic Width	NS		NS	80* -35 83*	NS	NS	NS	NS	-67 -76 -75	NS	NS	-28 -68 -32	NS	NS
Weight	NS		-57 -62 -51 -44 -37 -06	-29 -45 -21 -18 -22 79*	NS	NS	NS	NS	-72 -71 -77 -74 -68 -68	NS			NS	
Dental Index	NS		NS	65 -73 64 85	NS	NS	1 50 48 -30	NS	NS	NS			NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	4 8					5 6					4 5			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS				NS		-77 -79 -88 -85 -90 -90	NS	NS	NS
Shoulder Width	NS				NS				NS		-78 -99* -90	NS	NS	NS
Pelvic Width	NS		NS	NS	NS	84* 51 86+			NS				NS	
Weight	NS				NS				NS		-61 -75 -70 -82 -85 -86	NS	NS	NS
Dental Index	-89 -31 -29 -21				NS				NS				NS	

TABLE 130

MILTA SENTENCE COMPLETION

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	8		8	5 7		9 11		8 11	6 9		7 10	7 9		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS	-34 -38 -45 -49 -55 -64*	-76 -71 -67 -65 -68 -56	6 6	-42 -58 -64 -51 -78 -84*	-34 -61 -49 -41 -72 -78*	NS	NS
Shoulder Width	NS		49 -39 -57	NS	NS	48 53 27	NS				NS			
Pelvic Width	NS		-70 -19 -67	NS	NS	NS	NS	-41 -41 -51	NS	NS	NS	-16 -82* -13	NS	NS
Weight	44 61 50 52 50 -83*	NS	NS				NS	NS	-73 -74 -76 -64 -66 -64	NS	NS			
Dental Index	NS		NS	33 59 34 -38	NS	NS	NS				80	NS	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)											4 5			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				-85 -87 -96* -92 -96* -96*	NS	NS	NS
Shoulder Width	NS		NS				NS				-85 -97* -87	NS	NS	NS
Pelvic Width	NS		NS				NS				NS			
Weight	NS		NS				NS				NS			
Dental Index	-69 -50 25 -75 -62		NS				NS				NS			

TABLE 131

RAVEN
(CORRECT RESPONSES)

Correlations with Physical Growth

Boys, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	8		8								7 10			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-46 -48 -42 -43 -40 -47	NS			NS				NS		21 -35 4 6 -33 -43	NS	NS	NS
Shoulder Width	65 -16 -32	NS	64 14 -51	NS	NS	NS			NS				NS	
Pelvic Width	NS				NS				NS				NS	
Weight	NS				NS				NS				NS	
Dental Index	NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	4 8		5 6		3 5				4 5		4 5			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	NS	-41 -37 -53 -54 -71 -82*	NS	93+ 93+ 100* 100* 94 94	NS	NS	NS	-90* -91* -96* -97* -99* -99*	NS			NS	
Shoulder Width	66 22 66	NS			NS				NS				NS	
Pelvic Width	NS				NS				NS				NS	
Weight	NS				NS		NS	NS	-83 -91* -88* -96* -96* -98*	NS			NS	
Dental Index	NS				NS				NS		92 94 94	NS	NS	NS

TABLE 132

NUMERICAL ANALOGIES (CORRECT RESPONSES)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (Range)		17 19	10 14	10 14	13 15	15	9 14		13 16	15 16		8 15	8 13		6 7	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS	41 36 44 34 52* 51*	23 04 25 28 33 40	NS	38 -22 40 44 01 44	32 29 30 37 -03 36	38 33 31 31 -13 23	NS	-46 -41 -44 -43 -39 -33	-12 -15 -24 -18 -19 -18	NS	NS	-41 -35 -36 -71* X -73*	X	NS	X
Shoulder Width	NS	NS	NS				NS				NS	NS	-53 -62 -75*	X	NS	X
Pelvic Width	NS	16 44 32	NS	-64* -28 -27	NS	NS	NS	NS	NS	-39 -41 -26	NS	-36 -34 -16	-46 54 51	X	53 50 07	X
Weight	NS	NS	NS	-57* -71* -51 -57* -58* -58*	NS	NS	NS	NS	-34 -35 -34 -37 -40 -33	-30 -32 -38 -40 -45 -39	NS	-27 -30 -36 -40 -37 -30	-35 -37 -31 -37 X -31	X	53 57 60 53 X 63	X
Dental Index	NS	31 45 37 51 53	NS				NS	NS	-26 -44 -43 -47 -08 -09	-13 -32 -30 -28 10 -14	-24 -22 -32 -32 -30 23	NS	NS	X	X	X

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (Range)			13 16	12 16			13 22			15 16	12 15		12 19		11 12	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS	NS	27 30 32 37 35 45	NS	NS	NS	43+ 06 48* 42 -09 33	NS	NS	29 25 29 45 49 51*	15 20 22 26 23 34	NS	-39 -38 -44 -16 X -23	X	57 58 63 63 X 83	X
Shoulder Width	NS	NS	NS	-16 -32 -09	NS	NS	NS	NS	NS	29 44 40	NS	NS	-28 -26 -45	X	NS	X
Pelvic Width	NS	NS	NS	-40 -39 -17	NS	NS	NS	NS	NS	-16 30 30	NS	NS	NS	X	64 76 45	X
	NS	NS	NS	-24 -30 -26 -31 -29 -29	NS	NS	NS	NS	NS	18 18 24 50 54* 54*	NS	NS	-33 -35 -39 -30 X -42	X	48 49 57 60 X 73	X
Dental Index	NS	NS	NS				NS				NS	NS	NS	X	NS	X

TABLE 133

NUMERICAL ANALOGIES
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
		17 19	10 14						13 16				8 13		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS	-36 -35 -38 22 -30 -30	-44 -47 -48 -51 -47 -51		NS		NS				NS				NS
Shoulder Width	NS		-72* -38 -25		NS		NS	NS	56* 22 11	NS	NS	NS	67* 92* 93*	NS	NS
Pelvic Width	NS		-45 -55* -55*		NS		NS	NS	57* 28 24	NS	NS				NS
Weight	NS		-40 -41 -46 -38 -35 -36		NS		NS	NS	62* 56* 55* 56* 60* 55*	NS	NS				NS
Dental Index	NS		-51 -70 -66 -82 00 -83		NS		NS				NS				NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
			13 16		19 21										11 12
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		NS				NS				NS				-45 -46 -48 -50 -- -64*
Shoulder Width	NS		NS	NS	57* -12 -18	NS	NS				NS				NS
Pelvic Width	NS		54* 38 13	NS	NS	NS	NS				NS				-32 -63* -11
Weight	NS		NS	NS	16 51* 21 20 28 -11	NS	NS				NS				-23 -28 -35 -40 -- -46
Dental Index	NS		NS				NS				NS				NS

TABLE 134

VERBAL ANALOGIES II
(CORRECTLY SOLVED SIMPLE ANALOGIES)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)	15	17		10	13	14		9	13	15		8	8		6
	18	19		14	15	15		15	16	16		15	13		7
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	36 28 36 25 47 40	55* 33 45 37 50* 48*	NS	43 43 45 48 43 47	33 -22 39 45 -24 40	19 22 26 30 37 25	NS	NS	NS	-27 -38 -39 -36 -36 -36	NS	NS	NS	X	-90 -87 -88 -87 00 -85
Shoulder Width	NS	NS	NS	70 44 27	NS	NS	NS	NS	-47 -05 -22	-63* -31 -37	NS	-57 -46 -44	-60* -71* -76*	X	-51 -63 -62
Pelvic Width	17 40 40	NS	NS	41 68 54	-39 -43 16	-38 -43 -09	NS	NS	-41 -37 -40	-56* -53* -51*	NS	-52 -60 -50	-56+ 23 31	X	
Weight	NS	NS	NS	35 36 40 34 26 23	-32 -30 -22 -22 -27 26	-30 -25 -25 -29 -44 -35	NS	-52 -48 -51 -58 -45 -69	-47 -55* -56* -59* -58* -59*	-54* -56* -61* -61* -65* -61*	NS	-48 -53 -63 -61 -67 -65	-33 -32 -28 -34 -- -33	X	
Dental Index	NS	NS	NS	41 -64 63 81	NS	NS	NS	NS	NS	-21 -37 -35 -35 -24	NS	NS	NS	X	

Summer Subjects

ALL CORRELATIONS N.S.

TABLE 135

VERBAL ANALOGIES II
(CORRECTLY SOLVED TRIPLE ANALOGIES)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 U III
N (range)				12 14	13 15			10 15		15 16		8 15	8 13		6 7
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		NS	NS	35 -24 43 48 -26 43	NS	NS				NS				-90* -87* -88* -87* -- -85*
Shoulder Width	NS		NS	64* 42 22	NS	NS	NS	NS	NS	-57* -27 -37	NS	-52^{+} -41 -39	-63* -77* -78*	NS	-51 -63 -62
Pelvic Width	NS		NS	37 58* 45	NS	NS	NS	NS	NS	-46 -48* -47	NS	-49 -58* -50	NS	NS	
Weight	NS		NS				NS	-49 -44 -46 -54 -40 -69*	NS	-48 -52* -57* -58* -62* -59*	NS	-47 -53* -62* -60* -67* -68*	NS	NS	
Dental Index	NS			34 58 56 70 --			NS				NS				

Summer Subjects

All correlations NS

TABLE 136

VERBAL ANALOGIES II
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
	15	17		10	13			9	13		15	8	8		6
	18	19		14	15			15	16		17	15	12		7
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	-41 -32 -40 -29 -47 -44	-46* -44 -51* -33 -47* -46	NS	-47 -48 -47 -53* -48 -52	-30 21 -38 -42 22 -37	NS	NS				NS				90* 87* 88* 87* -- 85*
Shoulder Width	NS		NS	-46 -53* -40	NS	NS	NS				36 40 45	53* 44 39	60^{+} 72* 76*	NS	61 63 62
Pelvic Width	NS		NS	-39 -62* -45	46 47 -14	NS	NS	58 63* 01	NS	NS	45 49 42	53* 64* 52*	NS	NS	NS
Weight	NS		NS	NS	44 41 34 39 33 37	NS	NS	60* 57 58^{+} 68* 47 76*	51 56* 53* 60* 60* 59*	NS	42 43 45 47 47 45	46 48 56* 55* 62* 60*	NS	NS	NS
Dental Index	NS		NS				NS				NS				NS

TABLE 137

QDR I
(CORRECT RESPONSES)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)			10 14	10 14				10 15				8 15			6 7
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS				NS		NS	-15 -73* -11 -19 -33 -24	NS	NS			NS		NS
Shoulder Width	NS				NS				NS		NS	-47 -50 -42	NS	NS	14 31 56
Pelvic Width	NS				NS				NS		NS	-59* -65* -47	NS	NS	-25 -98* -42
Weight	NS		-44 -51 -41 -45 -46 -48	-43 -47 -40 -35 -39 -43	NS	NS			NS		NS	-41 -33 -31 -40 -41 -38	NS	NS	NS
Dental Index	NS		-48 -39 -33 -13 -- -12	NS	NS	NS	-47 -57 -60 -36 -- -36	NS	NS	NS			NS		NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)				12 15	19 22										
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS				NS				NS				NS		NS
Shoulder Width	NS				NS				NS				NS		NS
Pelvic Width	NS		NS	-53 -52 -46	NS	NS			NS				NS		NS
Weight	NS		NS	-45 -42 -47 -47 -45 -44	45* 35 33 28 4 49*	NS			NS				NS		NS
Dental	NS				NS				NS				NS		NS

TABLE 138

QDR II
(CORRECT RESPONSES)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)	1 18	17 19	10 14	11 14	12 15			9 15	13 16	15 17	14 17	8 15	8 12		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	-29 -32 -37 -44 -32 -39	NS	43 45 45 50 48 44	32 19 32 31 35 42	NS	NS	NS	-31 84* -21 -33 -20 -40	NS	NS			NS		NS
Shoulder Width	NS		NS	NS	63* 78* 57*	NS	NS	-18 -50 -33	NS	-50* -25 -50*	-66* -45 -64*	-79* -84* -64*	NS	NS	NS
Pelvic Width	NS	18 41 45	NS	NS	70* 67* 44	NS	NS	NS	-52 -50 -49	NS	-72* -51* -64*	-72* -58* -44	-24 60 69*	NS	NS
Weight	NS		NS	NS	67* 68* 65* 70* 13 67*	NS	NS	NS	-44 -47 -47 -40 -45 -48	-69* -64* -58* -66* -60* -70*	-45 -44 -56+ -45 -47 -47	-80* -76* -71* -71* -67* -62*	NS	NS	NS
Dental Index	NS				NS		NS	NS	-54 -41 -34 -21 -57 -38	NS	NS	-44 -26 -33 -36 -48 -48	NS	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)			13 16				13 20			14 16	11 15	11 14			11 12
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS				NS		52* 14 48* 47* 20 51*	NS	NS	61+ 52* 52* 49 53* 52+	29 35 34 37 42 38	59* 57* 58* 59* 67* 59*	NS	NS	
Shoulder Width	NS				NS		NS	NS	NS	46 55* 49	NS	57* 57* 58*	NS	NS	45 43 62*
Pelvic Width	NS				NS				NS		NS	-24 62* 82*	NS	NS	37 62* 66*
Weight	NS		-52 -48 -41 -39 -33 -29	NS	NS	NS	NS	NS	NS	46 43 46 40 48 40	31 33 36 41 47 29	56* 62* 65* 73* 74* 73*	NS	NS	59* 52 59* 63* --- 73*
Dental	NS				NS				NS				NS		NS

TABLE 139

QDR II
(DIRECTIONAL ERRORS)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	1 18				13 15		9 15			13 16	14 17		8 12	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	40 21 34 27 37 36	NS	NS	NS	-31 -30 -27 -30 26 -12	NS	-66 -67 -62 -65 -60 -59	NS	NS	NS	NS	NS	NS	X
Shoulder Width	NS	NS	NS	NS	-60* -44 -59*	NS	-47 -54 -23	NS	NS	34 19 37	61 37 52	83 90 78	NS	X
Pelvic Width	NS	-08 -19 -43	NS	NS	-43 -54+ -22	NS	-60 -31 -71	NS	NS	NS	69 45 51	74 58 55	27 -60 -67	X
Weight	NS	NS	NS	NS	-56* -54+ -50 -60* -10 -59*	NS	-56 -62 -59 -63 -86 -55	NS	NS	45 38 27 40 33 33	41 40 48 43 44 44	66 65 58 59 56 53	NS	X
Dental	NS				NS		-52 -37 -36 -36 00 -36	NS	NS	NS	NS	NS	NS	X

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)	13 18	14 16			19 22	20 22	13 20		13 16	14 16		11 14	14 19		11 12
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS	NS	NS	NS	-43+ -46* -35 -40 -26 -42	-39 -14 -40 -40 -52* -43+	-66 -16 -61 -62 -14 -63	NS	-56* -55* -56* -47 -50+ -53*	-54* -54* -55* -52* -55* -57*	-34 -38 -39 -47 -53 -53	-70 -68 -69 -71 -78 -71	26 23 35 25 X 31	X	
Shoulder Width	NS	NS	NS	-24 -37 -51	-47* -42+ -36	-16 -46* -59*	-12 -67 -54	NS	NS	-25 -55* -50	NS	-53 -63 -62	-30 -08 -08	X	-31 -26 -45
Pelvic Width	-41 -31 -14	-40 -33 -23	NS	-60 -56 -35	NS	NS	-13 -52 -42	NS	NS	-42 -18 -16	25 -25 -28	-02 -74 -83	NS	X	
Weight	-38 -33 -34 -31 -26 -32	-26 -20 -24 -20 -23 -24	NS	-45 -35 -44 -43 -40 -36	-29 -48* -32 -38 -37 -20	-22 -19 -18 -17 -56* -13	-44 -29 -50 -48 -24 -05	NS	-52* -44 -43 -21 -30 -16	-42 -40 -34 -32 -40 -39	NS	-63 -68 -69 -77 -78 -78	NS	X	-53 -44 -49 -52 00 -61
Dental Index	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-33 -12 18	X	

TABLE 140

QDR II
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)	1 18		10 14	11 14	12 15		9 15		13 16			8 15			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		-40 -41 -42 -40 -36 -33	-56 -38 -49 -47 -48 -42	NS	NS	71* 64+ 63+ 64+ 66+ 64+	NS	NS	NS			NS		NS
Shoulder Width	NS		-48 -56* -45*	NS	NS	NS			NS			50 45 15			NS
Pelvic Width	NS		-70* -47 -56*	NS	NS	NS			NS				NS		NS
Weight	NS		-54* -59* -55* -58* -55* -51	NS	NS	NS	NS	NS	42 45 46 45 48 48	NS	NS	78* 71* 70* 69* 66+ 60+	NS	NS	NS
Dental Index	-39 -48 -27 -28 -- -31	NS	NS	NS	46 59 41 32 -- -33	NS			NS		NS	53 50 51 44 42 42	NS	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU
N (range)				13 16											11 12
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III
Height	NS		NS	47 44 49 44 43 30	NS	NS			NS				NS		-54 -54 -55 -56 -- -63*
Shoulder Width	NS				NS				NS				NS		-47 -56 -63*
Pelvic Width	NS		NS	54* 42 46	NS	NS			NS				NS		NS
Weight	NS		NS	47 37 39 31 24 17	NS	NS			NS				NS		NS
Dental Index	NS				NS				NS				NS		NS

TABLE 141

MILTA VOCABULARY

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)				11 14					13 16	15 17	14 17	8 15	8 13		6 7	2 7
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS		NS	45 39 49 40 42 37	NS	NS	NS				NS	-46 -47 -55* -46 -47 -48	NS	NS	-78* -82* -84* -74 -- -79*	-66 -66 -68 -60 -- -60
Shoulder Width	NS		NS				NS				NS	-36 -42 -49	NS	NS	-85* -95* -98*	-81* -86* -95*
Pelvic Width	NS		NS				NS				NS	-11 -61* -54*	-28 79* 66*	NS	NS	
Weight	NS		NS				NS	NS	-37 -47 -45 -52+ -52+ -58*	-45 -59* -48 -52* -53* -58*	-44 -48+ -53* -49* -46 -43	-62* -76* -63* -71* -68* -71*	NS	NS	-72 -71 -69 -75 -- -70	-52 -54 -52 -57 -- -50
Dental Index	NS		NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	
N (range)							13 19	11 19	13 16	14 16	11 15				6 10	6 10
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS		NS				41 23 44 39 32 42	NS	48 48 50+ 54+ 61* 59*	NS	NS					-34 -55 -29 -23 -- -22
Shoulder Width	NS		NS				NS	47* 32 13	35 52+ 57*	56* 32 25	55* 51* 61*	NS	NS	NS		-34 -41 -15
Pelvic Width	NS		NS				NS				-31 45 30	NS	NS	NS	NS	
Weight	NS		NS				NS	NS	NS	42 40 39 32 29 15	53* 52* 45 47 49 37	NS	NS	NS		-34 -56 -31 -30 -- -29
Dental Index	NS		NS				NS				NS				NS	

TABLE 142

MILTA SENTENCE COMPLETION

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 IN
N (range)	1 18	17 19			12 15						14 17	8 15	8 13	10 12	6 7	2 7
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS	43 38 39 25 31 27	NS				NS				NS					-64 -65 -66 -60 -- -55
Shoulder Width	48+ 49+ 41	NS	NS				NS				NS	-39 -41 -51+	-17 -66 -24	-49 -87* -72*	-57 -68 -84*	-69 -64 -50
Pelvic Width	33 53* 42	NS	NS				NS				NS	-50 -60* -62*	NS	NS		
Weight	47+ 51* 46 53* 62* 58*	NS	NS				NS				-51* -51* -55* -53* -53* -57*	-45 -51+ -54* -56* -58* -65*	NS	NS		-44 -49 -48 -45 -- -52
Dental Index	NS		NS	NS	-51 -50 -54 -31 -- -43	NS	NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 FU
N (range)					19 22			11 19	13 16	14 16		11 14				6 10
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS		NS	NS	65* 18 49* 45* 20 51*	NS	NS	58* 38 45+ 42 16 40	40 44 46 51 50 55*	NS	NS 45	40 44 44 46 44	NS	NS		14 -66* 06 -02 00 -07
Shoulder Width	NS		NS				NS				NS					-74* -49 -36
Pelvic Width	NS		NS				NS	NS	NS	-56* -07 10	NS	-24 42 66*	NS	NS		
Weight	NS		NS				NS				NS	37 43 54 61* 60* 50	NS	NS		
Dental Index	NS		NS				NS				NS				NS	

TABLE 143

MILTA ANALOGIES

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 IN
N (range)							8 15	9 15		15 17	14 17				6 7	2 7
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS				NS				NS		-32 -28 -34 -24 -23 -21	NS	NS	NS		
Shoulder Width	NS				NS		-48 -27 -11	NS	NS	NS	-57* -58* -65*	NS	NS	NS	-18 -21 -37	-31 -42 -69
Pelvic Width	NS				NS		-51 -41 -35	NS	NS	-32 -47 -56*	-60* -44 -49	NS	NS	NS		-06 72 57
Weight	NS				NS		-55 -54 -58 -62+ -69* -72*	-42 -43 -47 -40 -54 -43	NS	NS	-59* -61* -67* -62* -62* -61*	NS	NS	NS		
Dental Index	NS				NS		NS	-49 -47 -44 -29 -30	NS	NS			NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 IN
N (range)								11 19		14 16	11 15	11 14	14 19			6 10
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS				NS		NS	70* -01 68* -67* 42 64*	NS	53* 51* 53* 62* 65* 66*	46 44 45 45 46 44	28 36 35 38 30 39	NS	NS		-31 -48 -44 -49 00 -52
Shoulder Width	NS				NS		NS	02 64* 67*	NS	NS	62* 51* 54*	NS	-45 -57* -44	NS		
Pelvic Width	NS				NS				NS		-33 52* 49	NS	NS	NS		
Weight	NS				NS		NS	41 17 47 49 47 49	NS	NS	57 61 61 61 65 54	22 27 39 46 47 33	NS	NS		
Dental Index	NS				NS				NS				NS		NS	

TABLE 144

MILTA CONCEPTS

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)							8 15	9 15	13 16	15 17	14 17	8 15		8 13
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	X NS	X	NS				NS				NS	-60* -79* -66* -62* -63* -61*	NS	49 60 60 44 0 39
Shoulder Width	X NS	X	NS				NS	NS	-59* -12 -27	-54* -37 -58*	-58* -32 -40	-59* -06 -01	NS	NS
Pelvic Width	X NS	X	NS				-33 -44 -03	NS	NS	-47 -41 -53*	NS			
Weight	X NS	X	NS				-34 -18 -22 -26 -38 -34	NS	-45 -57* -54* -55* -57* -61*	NS	53* -51* -51* -49+ -46 -41	-56* -61* -53* -58* -60* -57*	NS	NS
Dental Index	X NS	X	NS				NS	-42 -51 -49 -18 -23	NS	NS	NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 IN
N (range)			13 16				13 20			14 16		11 14	14 19			6 10
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	X NS	X	33 44 40 41 42 40	NS	NS	NS	48+ -10 47 43 36 40	NS	NS	44 41 42 43 47 47	NS	33 40 39 41 36 42	-61* -71* -62* -55* -- -53*	-37 -43 -45 -24		
Shoulder Width	X NS	X	NS				NS				NS	NS	-43 -49+ -51*	NS		
Pelvic Width	X NS	X	NS				NS				NS	-16 23 53	NS	NS		
Weight	X NS	X	NS				NS				NS	25 27 39 46 47 33	NS			-32 -44 -39 -33 00 -59
Dental Index	X NS	X	NS				NS				NS					

TABLE 145

RAVEN
(PERFORMANCE)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	1 18		10 14				8 15		13 16				14 17	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	40 36 50+ 51* 67* 57*	X	47 29 45 40 44 47	X	NS	X	-29 -26 -26 -25 -56* -29	X	NS	X	32 23 23 35 34 36	X	-39 -35 -35 -20 -- -20	X
Shoulder Width	24 42 16	X	560 27 14	X	NS	X	08 42 03	X	-54* -22 -30	X	NS	X	-70* -36 -40	X
Pelvic Width	20 5[illegible] 4[illegible]	X	12 44 37	X	NS	X	NS	X	-32 -30 -23	X	NS	X	-62* 13 69*	X
Weight	31 31 35 52* 54* 34	X	34 31 38 36 32 30	X	NS	X	NS	X	-26 -27 -33 -37 -37 -37	X	NS	X	-44 -46 -42 -18 X -19	X
Dental Index	NS	X	NS	X	NS		-56 -63 -50 -38 X -45	X	NS	X	NS	X	NS	X

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	13 17		13 16				13 20				12 15		14 19	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	X	34 31 39 38 39 41	X	NS	X	NS	X	NS	X	NS	X	-18 -17 -27 -33 X -41	X
Shoulder Width	NS	X	NS	X	NS	X	NS	X	NS	X	NS	X	NS	X
Pelvic Width	-45 -41 -33	X	NS	X	NS	X	20 20 55*	X	NS	X	-56* -05 -16	X	NS	X
Weight	-46 -44 -48+ -43 -37 -35	X	NS	X	NS	X	NS	X	NS	X	NS	X	NS	X
Dental Index	NS	X	NS		-41 -50 -41 -32 -32 13	X	NS	X	NS	X	NS	X	NS	X

TABLE 146

RAVEN
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	16 18		10 14						13 16				8 13	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		-46 -35 -39 -47 -42 -49	NS	NS	NS	NS				NS			
Shoulder Width	NS		-25 -46 -41	NS	NS	NS	NS	NS	67* 42 44	NS	NS	NS	76* 74* 71*	NS
Pelvic Width	NS		-42 -27 -50	NS	NS	NS	NS	NS	61* 59* 58*	NS	NS			
Weight	NS		-40 -35 -42 -31 -26 -24	NS	NS	NS	NS	NS	74* 72* 71* 75* 77* 84*	NS	NS	NS	57 63* 61* 66	NS
Dental Index	NS		NS				NS				NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	13 18												14 19	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				NS	NS	34 34 39 55* -- 53*	NS
Shoulder Width	NS		NS				NS				NS			
Pelvic Width	NS		NS				NS				NS			
Weight	NS		NS				NS				NS			
Dental Index	NS		NS				NS				NS			

TABLE 147

G.S.A.T.
(CORRECT RESPONSES)

Correlations with Physical Growth

Girls, High Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 FU
N (range)			10 14				8 15				14 17					
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS		61* 43 54 46 47 47	NS	NS	NS	NS				NS				NS	
Shoulder Width	NS		NS				NS				-54* -20 -21	NS	NS	NS	NS	
Pelvic Width	NS		NS				NS				-47 -33 -34	NS	NS	NS	NS	
Weight	NS		NS				NS				-58* -52* -51* -57* -56* -57*	NS	NS	NS	NS	
Dental Index	NS		NS				-45 -82	NS	NS	NS	NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN		9 FU	9 FU
N (range)							13 20									6 10
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Height	NS		NS				-32 -44 -43 -47 -30 -49	NS	NS	NS	NS					-14 -53 -68 -86* 00 -78*
Shoulder Width	NS		NS				-46 -59* -57*	NS	NS	NS	NS					61 62 26
Pelvic Width	NS		NS				NS				NS					57 63 61
Weight	NS		NS				-31 -52+ -55* -60* -45 -59*				NS					44 41 37 45 00 35
Dental Index	NS		NS				-45 -27 -28 -34 34 -27				NS				NS	

TABLE 148

VERBAL ANALOGIES II
(CORRECTLY SOLVED SIMPLE ANALOGIES)

Correlations with Physical Growth

Girls, Medium Level

Winter Subjects

ALL CORRELATIONS NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)			10 20		12 30	10 20	12 24	10 26			13 20			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	NS	45* 53* 49* 49* 53* 46*			NS				NS	
Shoulder Width	NS		NS	NS	42 24 14	64* 42 48			NS				NS	
Pelvic Width	NS		-39 -35 -19	NS	NS	NS	34 42 32	NS	NS	NS			NS	
Weight	NS	NS	NS	NS	NS	40 65* 46* 55* 57* 57*	30 54+ -37 38 39 41+	46* 52* 48* 49* 52* 54*	NS	NS	36 32 37 43 42 42	NS	NS	NS
Dental Index	NS				NS		57 80	NS	NS	NS			NS	

TABLE 149

VERBAL ANALOGIES II
(CORRECTLY SOLVED TRIPLE ANALOGIES)

Girls, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		17 27		13 17		9 21		4 20	11 21	11 19		12 21	10 23	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				NS			
Shoulder Width	NS	46+ 14 10	NS				NS	NS	42 12 28	NS	NS			
Pelvic Width	NS		NS	47 59* 40	NS	-06 08 42	NS	NS	NS	-27 -42 -38	NS	NS	-63*	NS
Weight	NS	33 45 23 27 -21 20	NS				NS	NS	NS	-32 -41 -47* -50* -52* -50*	NS	NS	-16 -59* -23	NS
Dental Index	NS		NS				NS	44	NS	NS	NS	42	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)			10 20		12 30	10 28	11 24	7 26			13 20		7 18	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	NS	39* 50* 42* 38+ 42* 36	NS				NS			
Shoulder Width	NS		NS	NS	46+ 26 12	66* 44 50	NS				NS			
Pelvic Width	NS		-53 -51 -46	NS	NS	NS	NS				NS	NS	58	NS
Weight	NS		-19 -34 -11 -14 14 -15	NS	NS	39* 59* 44* 56* 48* 60*	NS	51* 46 51* 50* 54* 53*	NS	NS	41 35 42 45 44 43	NS	NS	NS
Dental Index	NS		NS				38 60	NS	NS	NS	NS			

TABLE 150

QDR II
(DIRECTIONAL ERRORS)

Correlations with Physical Growth

Girls, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)								4 19	11 20		12 20	12 21		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				-31 -47 -05 12 -02 -03	NS	NS	NS
Shoulder Width	NS		NS				NS	NS	-62* -28 -49	NS	-32 -30 -29	NS	NS	NS
Pelvic Width	NS		NS				NS				NS	-17 -63* -15	NS	NS
Weight	NS		NS				NS				NS			
Dental Index	NS		NS				NS	-50	NS	NS	NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)			10 20	10 21		11 27		6 25		11 19				
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS	NS	NS	-27 -51 -27 -22 -18 -19	NS			
Shoulder Width	NS		NS	25 52 52	NS	NS	NS	NS	NS	-51 -56 -56+	NS			
Pelvic Width	NS		NS				NS	-57 -73+ -83*	NS	-62* -64* -23	NS			
Weight	NS		27 40 20 16 5 17	NS	NS	NS	NS	NS	NS	-57* -70* -58* -62* -60* -58*	NS			
Dental Index	NS		NS	NS	NS	-72*	NS				NS			

TABLE 151

MILTA CONCEPTS

Correlations with Physical Growth

Girls, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		17			11	9			12		15	14		13
		29			24	22			20	NS	21	21		22
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
	NS	15	NS	NS	44+	37	NS	NS	40	16	30	41	NS	-38
		42			42	38			47	30	57*	38		-40
		06			45+	34			27	-14	36	00		-35
Height		18			51*	27			27	03	47*	-01		X
		-17			46+	22			07	-23	12	01		X
		14			47+	21			10	-15	22	02		X
	43	46+	43	NS	59*	57*								
Shoulder	37	32	37		71*	56+			NS				NS	
Width	39	32	39		72*	40								
	NS	-02	NS	NS	53	36								
Pelvic		37			51	14			NS				NS	
Width		34			63*	-01								
	NS	-15	NS	NS	26	20								
		33			45	43								
		-20			29	22								
Weight		-19			38	22			NS				NS	
		-16			36	21								
		-25			35	17								
Dental	NS				NS				NS				NS	
Index														

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		11			12	10	7				13			14
		23			17	27	26				20			19
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
	NS	44*	NS	NS	NS	24	NS	NS	NS	NS	NS	NS	NS	NS
		43				29								
		37				31								
Height		40				40+								
		-14				44*								
		40				39								
	NS	41					63*	NS	NS	NS				
Shoulder		09			NS		46						NS	
Width		35					31							
	NS	44	NS	NS	-11	NS	30	NS	NS	NS				
Pelvic		22			-24		-14						NS	
Width		32			-52^{o}		-06							
	NS	30	NS	NS	NS	28	53*	NS	NS	NS				
		58*				56*	81*							
		30				33	49*							
Weight		32				29	53*						NS	
		-04				42+	53*							
		27				44*	53*							
	-46	NS	NS	NS	NS	63*	63*	NS	NS	NS	40	NS	NS	NS
	X													
	-49													
Dental	X													
Index	X													
	-27					67*								

TABLE 152

RAVEN
(STRUCTURAL ERRORS)

Correlations with Physical Growth

Girls, Medium Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)					11 24				12 20				10 23	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS	X	NS	X	NS	X	NS	X	NS	X	NS	X	NS	X
Shoulder Width	NS	X	NS	X	46 62* 60*	X	NS	X	03 54 40	X	NS	X	NS	X
Pelvic Width	NS	X	NS	X	48 56* 43	X	NS	X	NS	X	NS	X		X
Weight	NS	X	NS	X	18 57* 18 21 21 25	X	NS	X	NS	X	NS	X	NS	X
Dental Index	NS	X	NS	X	21 X X X 41	X	NS	X	-41 X 15 X X X	X	-51	X	NS	X

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	10 23				12 28		7 27		12 21		13 20		10 19	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	-33 -47 -36 -36 -05 -33	X	NS	X	-28 -37 -33 -27 -33 -21	X	-15 -34 -25 -23 -35 -21	X	NS	X	NS	X	NS	X
Shoulder Width	-62* -31 -64*	X	NS	X	-31 -00 -02	X	-55* -21 -17	X	-27 -35 -28	X	-44 -54+ -46	X	35	X
Pelvic Width	-26 -38 -37	X	NS	X	NS	X	NS	X	-40 -44 -02	X	-20 -39 15	X	NS	X
Weight	-27 -51 -25 -24 -07 -23	X	NS	X	-26 -34 -26 -30 -37 -33	X	-57* -32 -35 -43* -38	X	-37 -52+ -46* -46* -48* -54*	X	NS	X	10 42 11 X X X	X
Dental Index	NS	X	NS	NS	NS	NS	-40 X X X X -65	NS	-58 X -10 X X X	X	-44 X -42 X X X	X	NS X X X X X	X

TABLE 153

NUMERICAL ANALOGIES

Correlations with Physical Growth

Girls, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)					4 5	5 5	4 5		7 12	9 11	7 11			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	65 52 38 39 06 -20	65 61 47 56 21 01	92 95* 96* 95* 81 65	NS	NS	46 34 14 25 -47 -63	25 15 -08 -10 -71 -57	NS	NS	NS
Shoulder Width	NS		NS	NS	81 59 74	97* 30 53	97* 90 95*	NS	-68* -55 -29	NS	17 -20 57	NS	NS	NS
Pelvic Width	NS				NS				NS		NS	NS	53 48 44	NS
Weight	NS				NS		89 94+ 93+ 96* 94+ 93+	NS	NS	NS			NS	
Dental Index	NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	11 16	11 16		7 13	4 8						6 9	7 9		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	NS	-65 -73 -80+ -85* -87* -86	NS			NS				NS	
Shoulder Width	NS				NS				NS				NS	
Pelvic Width	NS				NS				NS				NS	
Weight	NS	64* 63* 66* 68* 47 58*	NS	27 20 35 45 29 34	NS	NS			NS		45 47 53 52 56 62	59 64 62 58 65 68+	NS	NS
Dental Index	NS				NS				NS				NS	

TABLE 154

QDR II
(CORRECT RESPONSES)

Correlations with Physical Growth

Girls, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)	8 13		7 8		4 5						7 11	8	4 8	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				61* 50 59 47 08 -33	NS	NS	NS
Shoulder Width	20 54 39	NS	56 7 62	NS	-31 -91* -76	NS	NS				NS	-52 -59 -25	NS	
Pelvic Width	NS		1 33 67	NS	NS	NS					46 43 39	NS	NS	NS
Weight	NS		NS	NS	-43 -46 -47 -45 -38 -36	NS	NS				NS	-54 -49 6 -13 -18 -22	60 48 43 41 48 50	NS
Dental Index	NS		NS				NS				-58 -21 -57 -56 -- -58	NS	NS	NS

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		11 16		8 13							6 9			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS				NS				-49 -51 -48 -52 -42 -40	NS	NS	NS
Shoulder Width	NS	39 -29 56*	NS				NS				NS			
Pelvic Width	NS	32 73* 73*	NS	-19 -59 -56	NS	NS	NS				-52 -66 -44	NS	NS	NS
Weight	NS	00 01 13 55* 23 63*	NS				NS				NS			
Dental Index	NS		NS	-23 50 34 35	NS	NS	NS				NS			

TABLE 135

MILTA VOCABULARY

Correlations with Physical Growth

Girls, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)			7 8						7 12		7 11			
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS						69* 65* 63 45 -46 -61		06 00 -25 -41 -86* -88*	NS	NS	NS
Shoulder Width	NS		NS				NS				09 01 58	NS	NS	NS
Pelvic Width			36 67 52	NS	NS	NS	NS				NS			
Weight	NS		47 67 75* 75* 65 61	NS	NS	NS	NS				NS			
Dental	NS		94 89 85 80 X 92	NS	NS	NS	NS				NS			

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		11 16	12 13	8 13								8 9		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	46 43 46 47 39 29	NS	NS	NS				NS			
Shoulder Width	NS	-12 -24 68*	NS	-27 92* -09	NS	NS	NS				NS			
Pelvic Width	NS		NS				NS				NS	43 40 42	NS	NS
Weight	NS		41 45 49 47 38 50	NS	NS	NS	NS				NS			
Dental Index	NS		NS				NS				NS			

TABLE 156

MILTA CONCEPTS

Correlations with Physical Growth

Girls, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)									9 12	8 10	7 11		4 8	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS		NS	NS	40 38 37 24 -18 -40	62 51 29 52 -39 -51	24 07 -15 -08 -76* -83*	NS	71 88* 83 94+ 91 91	NS
Shoulder Width	NS				NS				NS		-04 -14 76*	NS	92* 88 76*	NS
Pelvic Width	NS				NS				NS		NS	NS	95* 98* 96*	NS
Weight	NS				NS		NS	NS	4 -21 -30 -73 57 64		-20 -32 -32 -94* -13 -02	NS	88* 95* 94* 94+ 98+ 98*	NS
Dental Index	NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)												8 9	8 9	
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS				NS		NS	65 60 45 50 27 10	NS	NS
Shoulder Width	NS				NS				NS				NS	
Pelvic Width	NS				NS				NS		NS	83* 73* 84*	NS	NS
Weight	NS				NS				NS		NS	95* 92* 94* 93* 92* 90*	NS	NS
Dental Index	NS				NS				NS				NS	

TABLE 157

MILTA ANALOGIES

Correlations with Physical Growth

Girls, Low Level

Winter Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)									7 12		7 11	8		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS				NS				NS		24 29 -18 -18 -88* -89*	65 57 54 30 -35 -62	NS	NS
Shoulder Width	NS				NS		NS	NS	62 29 88*	NS			NS	
Pelvic Width	NS				NS				NS		NS	48 52 49	NS	NS
Weight	NS				NS				NS		-28 -37 -19 -82* -19 -08	NS	NS	NS
Dental Index	NS				NS				NS				NS	

Summer Subjects

Grade	5 IN		6 FU		6 IN		7 FU		7 IN		8 FU		8 IN	
N (range)		11 16	12 13	8 13								8 9		
Exam	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
Height	NS		NS	52 51 52 52 46 38	NS	NS			NS		NS	62 57 20 25 03 -08	NS	NS
Shoulder Width	NS		21 12 64*	-27 93* -07	NS	NS			NS				NS	
Pelvic Width	NS				NS				NS		NS	77* 46 64	NS	NS
Weight	NS	50+ 39 49 57 73* 44			NS		NS	NS	NS	NS	NS	84* 80* 71* 66 63 57	NS	NS
Dental	NS		-54 -51 -52 -60 X -59	NS	NS	NS			NS				NS	